Attachment 1:

Recirculation of Recaptured Water Year 2010 SJRRP Interim Flows Environmental Assessment

RECLAMATION

Managing Water in the West

Final Environmental Assessment

Recirculation of Recaptured Water Year 2010 San Joaquin River Restoration Program Interim Flows

U.S. Department of the Interior
Bureau of Reclamation
Mid Pacific Region
Sacramento, California

July 2010

Mission Statements

The mission of the Department of the Interior is to protect and provide access to our Nation's natural and cultural heritage and honor our trust responsibilities to Indian Tribes and our commitments to island communities.

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

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List of Acronyms and Abbreviations

AEWSD	Arvin-Edison Water Storage District
AF	acre-feet
BO	Biological Opinion
CAA	Clean Air Act
CFR	Code of Federal Regulations
cfs	cubic-feet per second
CiF	City of Fresno
CVC	Cross Valley Canal
CVP	Central Valley Project
CVPIA	Central Valley Project Improvement Act
DMC	Delta-Mendota Canal
DWR	Department of Water Resources
EA	environmental assessment
EA/IS	Environmental Assessment/Initial Study
EFH	Essential Fish Habitat
ESA	Endangered Species Act
FID	Fresno Irrigation District
FKC	Friant-Kern Canal
FONSI	Finding of No Significant Impact
FWCA	Fish and Wildlife Coordination Act
FWUA	Friant Water Users Authority
GHG	greenhouse gases
ITA	Indian Trust Assets
LTRID	Lower Tule River Irrigation District
MBTA	Migratory Bird Treaty Act
National Register	Nation Register of Historic Places
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NRDC	National Resources Defense Council
NWR	National Wildlife Refuge
OCID	Orange Cove Irrigation District
Reclamation	Bureau of Reclamation
Settlement	Stipulation of Settlement in *NRDC, et al., v. Kirk Rodgers, et al.*
SJRRP	San Joaquin River Restoration Program
SJVAB	San Joaquin Valley Air Board
SJVAPCD	San Joaquin Valley Air Pollution Control District

SLR	San Luis Reservoir
SWP	State Water Project
SWRCB	State Water Resources Control Board
TLBWSD	Tulare Lake Basin Water Storage District
TID	Tulare Irrigation District
USC	United States Code
USFWS	U.S. Fish and Wildlife Service
WY	Water Year

Definitions

Central Valley Project (CVP): U.S. Bureau of Reclamation federal water project in California that was originated in 1933 to provide irrigation and municipal water by regulating and storing water in reservoirs and delivering it via a series of canals and pumping facilities throughout the Central Valley. The CVP also provides energy generation and flood control.

Class 1 Water: The supply of water stored in or flowing through Millerton Lake which, subject to the contingencies described in the water service contract, will be available for delivery from Millerton Lake and the Friant-Kern and Madera Canals as a dependable water supply during each Contract Year.

Class 2 Water: The supply of water which can be made available subject to the contingencies described in the water services contract for delivery from Millerton Lake and the Friant-Kern and Madera Canals in addition to the supply of Class 1 water. Because of it uncertainty as to availability and time of occurrence, such water will be undependable in character and will be furnished only if, as, and when it can be made available.

Friant Division: The combined CVP facilities of Friant Dam, Millerton Lake, Friant-Kern Canal, and Madera Canal that are used to store, delivery, transport, and deliver Project Water to the Friant Division Service Areas.

Friant Division Service Area: The area within which CVP water may be served to Friant Division water users as defined by project authorizations and the State Water Resources Control Board.

Long-Term Contractors: All parties who have water service contracts for a specified quantity of Class 1 and/or Class 2 water from the Friant Division of the CVP with the United States pursuant to Federal Reclamation law.

Project Water: All water that is developed, diverted, stored, or delivered for the benefit of the Friant Division Service Area available from Millerton Lake in accordance with the statutes authorizing the Friant Division, and in accordance with the terms and conditions of water rights permits acquired pursuant to California Law.

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Section 1 Purpose and Need for Action

1.1 Background

In 1988, a coalition of environmental groups, led by the Natural Resources Defense Council (NRDC), filed a lawsuit challenging renewal of long-term water service contracts between the United States and Central Valley Project (CVP) Friant Division contractors. After more than 18 years of litigation of this lawsuit, known as *NRDC, et al., v. Kirk Rodgers, et al.*, a Settlement was reached. On September 31, 2006, the Settling Parties, including NRDC, Friant Water Users Authority (FWUA), and the U.S. Departments of the Interior and Commerce, agreed on the terms and conditions of the Settlement, which was subsequently approved by the U.S. Eastern District Court of California (Court) on October 23, 2006.
The Settlement establishes two primary goals:

- Restoration Goal – To restore and maintain fish populations in "good condition" in the mainstem San Joaquin River below Friant Dam to the confluence of the Merced River, including naturally reproducing and self-sustaining populations of salmon and other fish.

- Water Management Goal – To reduce or avoid adverse water supply impacts on all of the Friant Division long-term contractors that may result from the Interim Flows and Restoration Flows provided for in the Settlement.

The planning and environmental review necessary to implement the Settlement is authorized under Section 3406(c)(1) of the Central Valley Project Improvement Act (Public Law 102-575) and the San Joaquin River Restoration Settlement Act (Act), included in Public Law 111-11, the Omnibus Public Land Management Act of 2009. The Secretary of the Interior is authorized and directed to implement the terms and conditions of the Settlement through the Act.
The San Joaquin River Restoration Program (SJRRP) will implement the Settlement. The Settlement identifies the need for a plan for recirculation, recapture, reuse, exchange or transfer of Interim Flows to reduce or avoid impacts to Friant long-term contractors.

1.2 Purpose and Need

NEPA regulations require a statement of "the underlying purpose and need to which the agency is responding in proposing the alternatives, including the Proposed Action (40 Code of Federal Regulation (CFR) 1502.13).

The purpose of the Proposed Action is to implement the provisions of the Settlement pertaining to the Water Management Goal for WY 2010 Interim Flows. The need for the action is to reduce or avoid water supply impacts to Friant Division long-term contractors by providing mechanisms to ensure that recirculation, recapture, reuse, exchange, or transfer of Interim Flows occurs.

An Environmental Assessment/Initial Study (EA/IS), Finding of No Significant Impact (FONSI), and Mitigated Negative Declaration (MND) were prepared and approved for WY 2010 Interim

Flows. Because Interim Flows and their associated actions are directly related to the availability of water for recirculation back to the Friant Division long-term contractors, the *Water Year 2010 Interim Flows Project Final Environmental Assessment and Finding of No Significant Impact/Initial Study and Mitigated Negative Declaration* is hereby incorporated by reference into this document.

1.3 Scope

The San Joaquin River Restoration Program (SJRRP) was established in late 2006 to implement the Stipulation of Settlement in NRDC, et al. v. Kirk Rodgers, et al. (Settlement). As an initial action to guide implementation of the SJRRP, the Settlement requires that the U.S. Department of the Interior, Bureau of Reclamation (Reclamation), modify releases from Friant Dam during water year from October 1, 2009, to September 30, 2010 for a program of interim flows in order to collect pertinent scientific data and to implement a monitoring program. Environmental effects for the release of interim flows from Friant Dam and down the San Joaquin River were addressed in the *Final Environmental Assessment and Finding of No Significant Impact/Initial Study and Mitigated Negative Declaration for Water Year 2010 Interim Flows Project*. Also addressed in this document was the potential recapture of interim flows at several diversion locations, including existing facilities in the Delta, the Mendota Pool at the downstream end of Reach 2B, the Lone Tree Unit of the Merced National Wildlife Refuge (NWR) (Lone Tree Unit) in the Eastside Bypass Reach 2, and the East Bear Creek Unit of the San Luis NWR (East Bear Creek Unit) in the Eastside Bypass Reach 3. Recirculation is subject to available capacity within the Central Valley Project (CVP)/State Water Project (SWP) storage and conveyance facilities, including the Jones and Banks pumping plants, California Aqueduct, DMC, San Luis Reservoir and related pumping facilities, and other facilities of CVP/SWP contractors. Available capacity is capacity that is available after all statutory and contractual obligations are satisfied to existing water service or supply contracts, exchange contracts, settlement contracts, transfers, or other agreements involving or intended to benefit CVP/SWP contractors served through CVP/SWP facilities. The WY 2010 EA/IS and FONSI/MND, including environmental analysis for recapture of Interim Flows, are incorporated by reference into this document and will not be discussed at length in this EA.

The Water Management Goal of the Settlement and Act includes a requirement for the development and implementation of a plan for recirculation, recapture, reuse, exchange or transfer of Interim Flows for the purpose of reducing or avoiding impacts to water deliveries to all of the participating Friant Division long-term contractors whose supplies may have been impacted by Interim Flow Releases. Paragraph 16 of the Settlement states:

> *16. In order to achieve the Water Management Goal, immediately upon the Effective Date of this Settlement, the Secretary, in consultation with the Plaintiffs and Friant Parties, shall commence activities pursuant to applicable law and provisions of this Settlement to develop and implement the following:*
>
> > *(a) A plan for recirculation, recapture, reuse, exchange or transfer of the Interim Flows and Restoration Flows for the purpose of reducing or avoiding impacts to water deliveries to all of the Friant Division long-term contractors caused by the*

Interim Flows and Restoration Flows. The plan shall include provisions for funding necessary measures to implement the plan. The plan shall:

> *(1) ensure that any recirculation, recapture, reuse, exchange or transfer of the Interim Flows and Restoration Flows shall have no adverse impact on the Restoration Goal, downstream water quality or fisheries;*
> *(2) be developed and implemented in accordance with all applicable laws, regulations and standards. The Parties agree that this Paragraph 16 shall not be relied upon in connection with any request or proceeding relating to any increase in Delta pumping rates or capacity beyond current criteria existing as of the Effective Date of this Settlement;*
> *(3) be developed and implemented in a manner that does not adversely impact the Secretary's ability to meet contractual obligations existing as of the Effective Date of this Settlement; and*
> *(4) the plan shall not be inconsistent with agreements between the United States Bureau of Reclamation and the California Department of Water Resources existing on the Effective Date of this Settlement, with regard to operation of the CVP and State Water Project.*

Reclamation, as the lead agency under the National Environmental Policy Act (NEPA) is preparing this document. This Environmental Assessment (EA) intends to analyze the environmental effects of completing the requirement of returning the recaptured water to the Friant Division long-term contractors.

1.4 Reclamation's Legal and Statutory Authorities and Jurisdiction Relevant to the Proposed Federal Action

Several Federal laws, permits, licenses and policy requirements have directed, limited, or guided the National Environmental Policy Act analysis and decision-making process of this EA and include the following as amended, updated, and/or superceded:

- Stipulation of Settlement in *NRDC, et al., v. Kirk Rodgers, et al.;*
- San Joaquin River Restoration Settlement Act, included in Public Law 111-11, the Omnibus Public Land Management Act of 2009;
- California State Water Resources Control Board, Division of Water Rights Order: WR2009-0058-DWR
- Central Valley Project Improvement Act (Public Law 102-575)
- Long-Term Water Service Contracts for Friant Division
- Title XXXIV Central Valley Project Improvement Act (CVPIA), October 30, 1992, Section 3405(a);
- Reclamation Reform Act, October 12, 1982;
- Reclamation's Interim Guidelines for Implementation of Water Transfers under Title XXXIV of Public Law 102-575 (Water Transfer), February 25, 1993;
- Reclamation and United States Fish and Wildlife Service (USFWS) Regional, Final Administrative Proposal on Water Transfers April 16,1998; and

- Reclamation's Mid-Pacific Regional Director's Letter entitled "*Delegation of Regional Functional Responsibilities to the Central Valley Project (CVP) Area Offices - Water Transfers*", March 17, 2008.

1.5 Resources of Potential Concern

Potentially affected resources and cumulative impacts in the project vicinity include: water resources, land use, biological resources, cultural resources, Indian Trust Assets, socioeconomic resources, environmental justice, air quality, and global climate change.

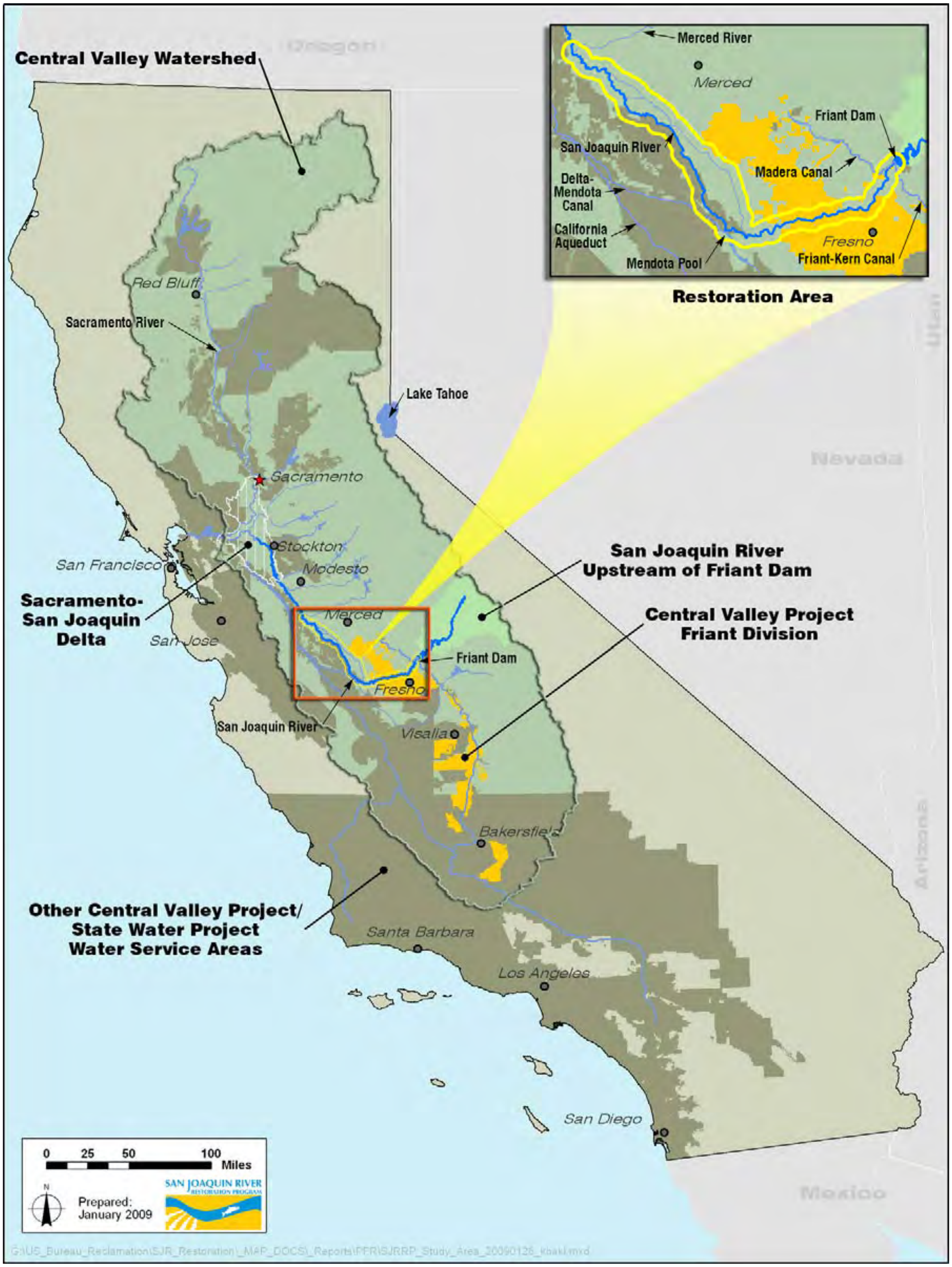

Figure 1
SJRRP Interim Flows Project Area in Relation to Friant Division and Other CVP/SWP Water Service Areas

Section 2 Alternatives Including the Proposed Action

2.1 No Action Alternative

Under the No Action Alternative, Reclamation would not pursue recirculating recaptured San Joaquin River Restoration to the Friant Division long-term contractors. This would not adhere to the Water Management Goal and the terms of the Settlement and Act. Therefore, Friant Division long-term contractors would not receive water "for the purpose of reducing or avoiding impacts to water deliveries to all of the Friant Division long-term contractors caused by the Interim and Restoration Flows". Water in SLR that would not be recirculated to Friant would potentially result in evaporative loss to some degree and may "spill" if not delivered out of the reservoir before demands for storage with high priorities occur.

2.2 Proposed Action

Recaptured water available for transfer to the Friant Division as a result of releases of flows from Friant Dam from the implementation of the SJRRP Interim Flows for Water Year 2010, specified as October 1, 2009 through September 30, 2010, is estimated to be up to 60,000 AF of the CVP Friant Division Class 2 water supply. This recaptured water will be available at SLR. The federal action is for Reclamation to enter into various 12 consecutive month transfer and exchange agreements to recirculate the recaptured water to the Friant Division. The transfers and exchanges would be completed through several mechanisms utilizing potential Federal, State, and Local Facilities, as outlined in the phases that follow. The recaptured water will be recirculated back to 16 of the Friant Division contractors whose supplies may be impacted by 2010 Interim Flow releases as Class 2 supplies.

Reclamation sought feedback from water contractors in order to develop options for the recirculation of water, consistent with the Settlement's Water Management Goal. This inquiry letter, included as Appendix A, requested options and scenarios from members of the Friant Division long-term contractors to distribute up to 60,000 AF of water out of SLR. These scenarios, considered in the Proposed Action of this environmental document, have been incorporated into separate recirculation phases, which have specific conveyance mechanisms and quantities associated with each phase, as outlined in the following text. The summary of the scenarios, as prepared by Reclamation, including a letter send to the Friant Division long-term contractors outlining the approach, are included as Appendix B.

2.2.1 Phase 1: Fresno Irrigation District – Exchange and East to West Transfer

Phase 1 of the Proposed Action would include having up to 25,000 AF of Friant Recirculation (Friant) water made available in Millerton Lake as a result of an exchange with Fresno Irrigation District (FID) and the City of Fresno (CiF). FID and CiF will exchange up to 25,000 AF of their CVP Friant Division Class 1 and Class 2 water supplies for a like amount of Friant Recirculation water in San Luis Reservoir. The Friant water now available in Millerton Lake would be made available for integration into Class 2 supplies as shown in Table 1. The transfer of the FID and CiF water is being covered under a separate contract and was analyzed in the *Environmental*

Assessment (EA-10-26) for *East to West Transfers between Friant Division and South-of-Delta Central Valley Contractors, 2010-2011*, which is hereby incorporated by reference.

2.2.2 Phase 2: Tulare Irrigation District and Lower Tule River Irrigation District Exchange with Tulare Lake Basin Water Storage District

Phase 2 of the Proposed Action includes Tulare Irrigation District (TID) and the Lower Tule River Irrigation District (LTRID) exchanging up to 16,225 AF of Friant water with Tulare Lake Basin Water Storage District (TLBWSD) where TID and LTRID's delivery of Friant water available in SLR would be used by the TLBWSD in exchange for TID and LTRID to use TLBWSD's Kaweah and Tule River water rights water as their CVP water allocation. By completing this exchange, water would be returned to TID and LTRID as shown in Table 1.

2.2.3 Phase 3: Fresno Irrigation District Exchange with Tulare Lake Basin Water Storage District

In Phase 3 of the Proposed Action, Tulare Lake Basin Water Storage District (TLBWSD), a SWP contractor, would take delivery of up to12,000 AF of Friant water in SLR. In turn, FID would take delivery of up to 11,400 AF of Kings River water and release an equal amount up to 11,400 AF of its Class 2 water in Millerton Lake for delivery to Class 2 contractors proportionally as shown in Table 1.

2.2.4 Phase 4: Arvin-Edison Water Storage District Exchange

For Phase 4, Arvin-Edison Water Storage District (AEWSD) would take delivery of the remaining water off the California Aqueduct and in exchange, AEWSD would make an equivalent amount of their Class 1 or Class 2 supplies available in Millerton Lake for delivery to Class 2 contractors proportionally as shown in Table 1.

AEWSD may be able to take delivery of the Friant water off of the California Aqueduct either at the Tupman turnout for the Cross Valley Canal or via the AEWSD turnout 39 miles downstream of Tupman. The total amount of recirculation water being transferred out of SLR would not exceed the 60,000 AF maximum. Whether or not FID, LTRID, TLBWSD and TID take their maximum quantities, AEWSD would take delivery of the difference, up to the maximum allowable amount based on recaptured quantities of restoration flows, and make an equivalent amount of their Class 1 or Class 2 water supplies available in Millerton Lake.

Table 1: Proposed Water Year 2010 SJRRP Recirculation Plan

Friant Division Class 2 Contractor	Class 2 Contract (AF)	Class 2 Contract (%)	Maximum Friant Recirculation Water Available (AF)	Percent Recirculation Amount Available from Millerton	Phase 1: FID and CiF Millerton Supply Exchange with Friant Recirculation Water in SLR (25,000 AF[1])	Phase 2: TID and LTRID Friant Recirculation Water Exchange with SWP TLBWSD Tule/Kaweah River Water (16,225 AF[1])	Phase 3: FID Millerton Supply Exchange with SWP TLBWSD Kings River; FID CVP Water Made Available in Millerton (11,400 AF[1])	Phase 4: AEWSD Takes Friant Recirculation Water in SLR and Exchange with CVP Water in Millerton (7,374 AF[1])
Arvin-Edison WSD	311,675	22.2%	13,343	32.90%	7,168	0	3,750	2,426
Chowchilla WD	160,000	11.4%	6,850	16.89%	3,680	0	1,925	1,245
Delano-Earlimart ID	74,500	5.3%	3,189	7.86%	1,713	0	896	580
Exeter ID	19,000	1.4%	813	2.01%	437	0	229	148
Fresno ID	75,000	5.4%	3,211	0	3,211	0	0	0
Gravelly Ford WD	14,000	1.0%	599	1.48%	322	0	168	109
Ivanhoe ID	500	0.0%	21	0.05%	11	0	6	4
Kaweah-Delta WCD	7,400	0.5%	317	0.78%	170	0	89	58
Lindmore ID	22,000	1.6%	942	2.32%	506	0	265	171
Lower Tule River ID	238,000	17.0%	10,189	0	0	10,189	0	0
Madera ID	186,000	13.3%	7,963	19.63%	4,277	0	2,238	1,448
Porterville ID	30,000	2.1%	1,284	3.17%	690	0	361	233
Saucelito ID	32,800	2.3%	1,404	3.46%	754	0	395	255
Shafter-Wasco ID	39,600	2.8%	1,695	4.18%	911	0	476	308
S. San Joaquin MUD	50,000	3.6%	2,141	5.28%	1,150	0	602	389
Tulare ID	141,000	10.1%	6,036	0	0	6,036	0	0

[1] For Water Year 2010, it is assumed that recaptured flows will be up to, but will not exceed 60,000 AF total. Therefore, the numbers shown are potential maximums.

Section 3 Affected Environment and Environmental Consequences

This section provides an overview of the physical environment and existing conditions that could be affected by the Proposed Action consistent with NEPA guidelines. Each resource discussion in this section will evaluate the impacts of the proposed action's alternatives. The baseline conditions assumed in this document consist of the existing physical environmental conditions as of June 2010. Therefore, the baseline environment includes the existing releases and recapture of Interim Flows on the San Joaquin River between Friant Dam and the confluence of the Merced River. Baseline conditions also assume water is stored SLR, and immediately ready for transfer.

CEQ regulations for implementing NEPA specify that environmental documents must succinctly describe the environment in the area(s) to be affected or created by the alternatives under consideration. The descriptions shall be no longer than necessary to understand the effects of the alternatives. Data and analysis must be commensurate with the importance of an impact, with less important material summarized, consolidated, or simply referenced.

3.1 Water Resources

3.1.1 Affected Environment

3.1.1.1 Friant Division Long-Term Contractors

The Friant Division is part of the original Central Valley Project. It irrigates over 1 million acres along the Central Valley's east side between Arvin and Chowchilla through the Friant-Kern and Madera canals with San Joaquin River water diverted out of Friant Dam. There are 29 Friant Division long-term water service contractors. Of these contractors, 24 deliver primarily agricultural water. An additional 7 agencies have Cross Valley Canal water exchange contracts capable of importing more than 128,000 acre-feet per year (AF/y) of additional water annually into the Friant service area from Northern California.

3.1.1.2 Fresno Irrigation District

FID is located entirely within Fresno County and has contracts for approximately 26 percent of the average runoff of the Kings River (its main supply). FID originally entered into a long-term contract with Reclamation in 1964. In 2001, FID entered into a long-term renewal contract with Reclamation for 75,000 AF/y of Friant Division Class 2 water (FID does not have a Friant Division Class 1 CVP contract). FID delivers the water to its customers through 800 miles of canals and pipelines. FID also has a long-term Cooperative Agreement with the City of Fresno (CiF) for their water utilization and conveyance.

FID has had an average supply of 6,450 AF/y of Class 2 water supplies from Millerton Lake. Currently, the 2010 water year Friant Division CVP Class 2 allocation is 30 percent, which provides FID with 22,500 AF. As a result, FID is 16,050 AF above their ten-year average supply.

3.1.1.3 The City of Fresno

CiF is a municipal and industrial Friant Division CVP contractor that utilizes a portion of their 60,000 AF/y Class 1 water supply to recharge the groundwater in and around the city, allowing them to withdraw groundwater on demand to serve municipal needs. CiF has had an average supply of 96.5 percent Class 1 water, which equates to 57,900 AF/y from Millerton Lake. With the current 2010 Friant Division CVP Class 1 allocation of 100 percent, CiF is 2,100 AF above their 10-year average supply. CiF has CVP water made temporarily surplus to their immediate needs by way of long-standing internal exchange agreements with FID for banked groundwater supplies, since the two districts share a common groundwater basin and distribution facilities.

3.1.1.4 Tulare Irrigation District

TID is located in western Tulare County on the east side of the San Joaquin Valley. TID provides agricultural water supplies and does not service the City of Tulare. TID entered into a long-term (40-year) contract with Reclamation in 1950 for 30,000 AF/y of Class 1 and 141,000 AF/y of Class 2 water supplies from the Friant Unit of the CVP. This contract was renewed in 1991 for 25 years. The district has pre-1914 water rights on the Kaweah River for approximately 75,000 AF/y of water. The district-owned Kaweah River water rights are Crocker Cut, Deep Creek, and Packwood Creek on the Lower Kaweah Branch; and Packwood Canal and Tulare Irrigation District on the St. Johns Branch. Water is also made available through share holdings in the following Kaweah River ditch companies likewise possessing pre-1914 water rights: 1) Tulare Irrigation Company on both the Lower Kaweah Branch and the St. Johns Branch, 2) Evans Ditch Company on the Lower Kaweah Branch and the St. Johns Branch, 3) Wutchumna Water Company on the Kaweah River, and 4) Persian Ditch Company on the Lower Kaweah Branch.

TID obtains CVP water supplies from its primary turnout on the Friant-Kern Canal which is located approximately 14 miles northeast of the District's service area. The water is diverted into the District's Main Intake Canal. TID also utilizes the St. Johns and Lowe Kaweah River turnouts from the Friant-Kern Canal. Local supply diversions into this Main Intake Canal include water from the Lower Kaweah and St. Johns River branches. The Packwood Creek diversion system begins at the terminus of the Lower Kaweah River, approximately 10 miles northeast of TID. Other diversion points include Cameron Creek, Evans Ditch, Tulare Irrigation Company Ditch, and the Ketchum Ditch.

3.1.1.5 Lower Tule River Irrigation District

LTRID is located in Tulare County. LTRID originally entered into a long-term renewable contract with Reclamation in 1951. In 1975, LTRID entered into a three-way contract with Reclamation and DWR to provide an additional 31,102 AF/y of CVP water supply. Under the original three-way contract, CVP water was diverted from the Sacramento-San Joaquin River Delta (Delta), conveyed through SWP facilities via the California Aqueduct to the Cross Valley Canal (CVC) and delivered to Arvin-Edison Water Storage District (AEWSD). Through the CVC Exchange Program, LTRID and AEWSD "swapped" their Delta and Friant CVP water supplies. The exchange agreement between AEWSD was eventually terminated, but LTRID may enter into similar exchange arrangements with other water districts to obtain their CVP water supplies from the Delta. In 2001, LTRID renewed its long-term contract with Reclamation for 61,200 AF/y of Class 1 and 238,000 AF/y of Class 2 water.

3.1.1.6 Tulare Lake Basin Water Storage District

TLBWSD is located southwest of the City of Corcoran in Kings County. TLBWSD is a SWP contractor and obtains its water supply from the SWP, Kings River, Tule River, and Kaweah River. TLBWSD is part of the 35-unit Kings River Conservation District and is also within the existing Friant Division Place of Use. TLBWSD manages Kings River South Fork water deliveries in Kings County. Empire No. 2 Weir diverts Kings River water into the Tulare Lake, Kings River-South Fork, and Blakeley canals which serve the Tulare Lake Bed. Although TLBWSD is connected to the California Aqueduct, the Tulare Lake Bed relies most heavily on Kings River water for irrigation purposes. Water is conveyed to TLBWSD via the California Aqueduct or released into the Kings River, Kaweah River, or Tule River from the Friant-Kern Canal (FKC).

3.1.1.7 Arvin-Edison Water Storage District

AEWSD is located in southern Kern County. AEWSD originally entered into a contract with Reclamation in 1964. In 2001, AEWSD renewed its contract with Reclamation for 40,000 AF/y of Class 1 and 311,675 AF/y of Class 2 water supplies. The Class 2 water supply comprises a large fraction of their contract allocation. However, this supply is variable. The district manages this supply by using an underlying groundwater reservoir to regulate water availability and to stabilize water reliability by percolating water through five spreading basins. AEWSD takes Friant CVP water from their Intake Canal, located at the terminus of the FKC, and serves landowners within its district through 45 miles of lined canals and 170 miles of pipeline. AEWSD can take Friant water off of the California Aqueduct either at the Tupman turnout for the Cross Valley Canal or via the AEWSD turnout 39 miles downstream of Tupman

3.1.1.8 Groundwater Resources

Fresno Irrigation District and the City of Fresno FID and CiF are located within the Kings Sub-basin of the Tulare Lake Hydrologic Region of the San Joaquin Valley Groundwater Basin (DWR 2003). The Kings Sub-basin groundwater aquifer system consists of unconsolidated continental deposits (DWR 2003). These deposits are an older series of Tertiary and Quaternary age overlain by a younger series of deposits of Quaternary age (DWR 2003). The Quaternary age deposits are divided into older alluvium, lacustrine and marsh deposits, younger alluvium, and flood-basin deposits (DWR 2003).

Most well water levels indicated a response to the 1976-77 drought (DWR 2003). After the 1987-92 drought, wells in the northeast showed water levels from 10 to 40 feet below pre-1976-77 drought water levels (DWR 2003). Water levels in the western sub-basin experienced declines of 10 to 50 feet during the 1987-92 drought and are in various stages of recovery to mid-1980s levels (DWR 2003). The Kings Sub-basin is one of 11 basins in California identified as being in a critical condition of overdraft. Overdraft is the condition of a groundwater basin in which the amount of water withdrawn by pumping over the long term exceeds the amount of water that recharges the basin. Overdraft is characterized by groundwater levels that decline over a period of years and never fully recover, even in wet years. Overdraft can lead to increased extraction costs, land subsidence, water quality degradation, and environmental impacts (DWR, 2003). A basin is subject to critical conditions of overdraft when continuation of present water management practices would probably result in significant adverse overdraft-related environmental, social, or economic impacts (DWR, 2003).

Tulare ID   TID is located in the Kaweah Sub-basin of the San Joaquin Valley Groundwater Basin which lies within Kings and Tulare Counties. The sub-basin's surface area is 446,000 acres. The Kaweah Sub-basin is bounded on the north by the Kings Sub-basin, by the Tule Sub-basin to the south, and by the Kings River Conservation District to the west. The Sierra Nevada foothills lie to the east. The Kaweah and St. Johns Rivers are the major rivers in the sub-basin. The Kaweah River system, as well as imported Class 2 and surplus supplies from the CVP Friant Unit, are the primary sources of groundwater recharge. Tulare ID practices conjunctive use recharge via direct deliveries to basins and in-lieu deliveries to water users within its sub-basin.

Most groundwater flow is to the southwest. In 1999 (DWR 2003), there were small groundwater depressions north and south of Visalia and at the northwest corner of the sub-basin. A mound was present in the central western portion of the basin. Land subsidence of up to four feet has occurred in the past in different areas within the western and southern portions of the sub-basin (DWR 2003). The Kaweah Sub-basin is one of 11 basins in California identified as being in a critical condition of overdraft

Lower Tule River ID   LTRID is located in the Tule Sub-basin of the San Joaquin Valley Groundwater Basin. This sub-basin is generally bounded by the Tulare County line on the west, by the Sierra Nevada bedrock on the east, the Tulare-Kern County line on the south, and the northern boundary of the LTRID on the north (DWR 2003). Continental deposits that make up the aquifer include flood-basin, younger alluvium, older alluvium, undifferentiated continental, and the Tulare Formation. Most are major sources of groundwater and are moderately to highly permeable. Groundwater recharge is done directly by stream recharge of the Tule River, White River, and Deer Creek, as well as delivery channel seepage, recharge basin percolation and deep percolation from applied irrigation water within LTRID (DWR 2003). Annual extraction of groundwater within the Tule Sub-basin is estimated to be 19,300 AF for urban and 641,000 AF for agricultural purposes. Recharge of the sub-basin from natural and applied water is estimated to be approximately 34,000 AF/y and 201,000 AF/y, respectively. In 1980, Tule Sub-basin was identified by DWR as being in critical overdraft (DWR 2003).

Tulare Lake Basin WSD   TLBWSD is located in the Tulare Lake Sub-basin of the San Joaquin Valley Basin. The sub-basin has an areas of 524,000 acres. Tulare Lake Sub-basin is bounded on the west by the California Aqueduct, the Westside Sub-basin, and the Kettleman Hills. The Kings Sub-basin is to the north and the Kaweah and Tule Sub-basins are to the east. The southern half of the sub-basin is in the bed of the former Tule Lake. Recharge is primarily from rivers and streams and deep percolation of irrigation water (DWR 1995). Corcoran Clay underlies the sub-basin.

Groundwater flows is generally to the southwest, in the direction of the former Tulare Lake. Land subsidence of one to four feet has occurred (DWR 2003). The Tulare Lake Sub-basin is one of 11 basins in California identified as being in a critical condition of overdraft

Arvin Edison WSD AEWSD lies within the Kern County Groundwater Subbasin of the San Joaquin Valley Basin. This subbasin has a surface area of just under two million acres and underlies most of western Kern County. Natural recharge is primarily from stream seepage along the eastern subbasin and the Kern River. However, the largest contributor to recharge is the system is applied irrigation water (DWR, 2006). Review of the subbasin indicates that except for seasonal variation resulting from recharge and pumping, the groundwater level wells have remained relatively unchanged from 1970 to 2000 (DWR, 2006). However, the Kern County Groundwater Subbasin has been identified by DWR as being critically overdrafted.

3.1.1.9 Conveyance Facilities

California Aqueduct/San Luis Canal and San Luis Reservoir/O'Neill Forebay
Except for the California Aqueduct, these joint-use facilities are a part of the SWP and CVP, respectively. The San Luis Canal is the Federally-built section of the California Aqueduct and extends 102.5 miles from O'Neill Forebay in a southeasterly direction to a point west of Kettleman City. At this point, the facility becomes the State's California Aqueduct; however, the California Aqueduct actually begins at the Banks Pumping Plant where the canal conveys water pumped from the Sacramento-San Joaquin River Delta directly into O'Neill Forebay.

SLR serves as the major storage reservoir and O'Neill Forebay acts as an equalizing reservoir for the upper stage dual-purpose pumping-generating plant. O'Neill Forebay is used as the hydraulic junction point for Federal and State waters. Pumps located at the base of O'Neill Dam take water from the DMC through an intake channel (a Federal feature) and discharge it into O'Neill Forebay. The pumping-generating units lift the water from O'Neill Forebay and discharge it into SLR. When not pumping, these units generate electric power by reversing flow through the turbines. During irrigation months, water from the California Aqueduct flows through O'Neill Forebay into the San Luis Canal instead of being pumped into SLR.

Cross Valley Canal and Intertie
The CVC, a locally-financed facility completed in 1975, extends from the California Aqueduct near Tupman to Bakersfield. Starting in 2007 and ending recently, the CVC was expanded. This expansion consisted of increasing the canal capacity and installing five new 500 cubic-feet-per-second (cfs) pumping plants, raising the canal liner in certain stretches, and constructing siphons and turnouts over 15 miles of its length. Kern County Water Agency (KCWA) also constructed a turn-out on the south side of the control structure to the AEWSD Intake Canal, a gravity bypass pipeline that connects to the newly-lined canal with an approximate capacity of 500 cfs, and a stub connection from the control structure that connects to a 500 cfs bi-directional pipeline intertie with the Friant-Kern Canal. A 500 cfs turnout/turn-in structure and pipeline was also constructed, which connects the California Aqueduct to the CVC. The overall design capacity was expanded to 1,422 cfs.

Delta-Mendota Canal
The DMC, completed in 1951, carries water southeasterly from the Tracy (C.W. "Bill" Jones) Pumping Plant along the west side of the San Joaquin Valley for irrigation supply, for use in the San Luis Unit, and to replace San Joaquin River water stored at Friant Dam and used in the Friant-Kern and Madera Canals. The DMC also provides water for municipal and industrial use. The DMC is about 117 miles long and terminates at the Mendota Pool, about 30 miles west of Fresno. The initial diversion design capacity is 4,600 cfs, which is gradually decreased to 3,211 cfs at the terminus. The DMC is a part of the CVP, Delta Division.

Friant-Kern Canal

The FKC carries water over 151.8 miles in a southerly direction from Friant Dam to its terminus at the Kern River, four miles west of Bakersfield. The FKC has an initial design capacity of 5,000 cfs that gradually decreases to 2,000 cfs at its terminus in the Kern River (Reclamation, 2010). The water conveyed in the FKC is from the San Joaquin River and is considered to be of good quality because it originates from snow melt from the Sierra Nevada. The water is used for municipal and industrial, and agricultural purposes in Fresno, Tulare, and Kern Counties. The FKC is a part of the CVP, which annually delivers about seven million AF of water for agricultural, urban, and wildlife use.

Madera Canal

The Madera Canal originates at Millerton Lake and runs approximately 36 miles north along the eastern edge of the San Joaquin Valley, ending at the Chowchilla River. The canal makes CVP water deliveries to the north to augment irrigation capacity. The canal has a design capacity of 1,000 cfs, and decreases in capacity along its length to 625 cfs at the terminus. Water conveyed in the Madera Canal is considered of good quality as its origin is that of snow melt from the Sierra Nevada range.

Figure 2
Depiction of Federal, State, and Local Conveyance Facilities in California
From Department of Water Resources (DWR). 2003. California's Groundwater, Bulletin 118, 2003

3.1.2 Environmental Consequences

3.1.2.1 No Action Alternative

Under the No Action Alternative, Reclamation would not pursue recirculating recaptured San Joaquin River Restoration to the Friant Division long-term contractors. This would not adhere to the Water Management Goal and the terms of the Settlement and Act. Therefore, Friant Division long-term contractors would not receive water "for the purpose of reducing or avoiding impacts to water deliveries to all of the Friant Division long-term contractors caused by the Interim and Restoration Flows". Water in SLR that would not be recirculated to Friant would potentially result in evaporative loss to some degree and may "spill" if not delivered out of the reservoir before demands for storage with high priorities occur.

3.1.2.2 Proposed Action

Overall water supply changes for the Friant Division long-term contractors as a result of the implementation of the SJRRP Interim Flow actions, and including recapture of Interim Flows, is discussed in the WY 2010 EA/IS. The WY 2010 EA/IS also included a potential range of recaptured water that could be returned to the Friant Division as part of the project description in order to assess water supply impacts. Therefore, discussion of water supply impacts associated with the implementation of Interim Flow releases from Friant or the recapture of flows will not be discussed in this document. This document intends only to focus on recirculation of flows. Recirculation, in this document, means moving recaptured SJRRP water from storage facilities back to the Friant Division long-term contractors or facilitating the transfers or exchanges necessary to meet the terms of the Settlement.

Under the Proposed Action, recirculation of water and delivery of recaptured water to Friant Contractors would occur through the execution of transfers or exchanges utilizing existing facilities for conveyance. The exchange would not increase or decrease existing CVP or SWP allocations. Water moved through this process would not require additional diversions and would not impact the overall existing operation of the water districts or their facilities.

On October 1, 2009, the California State Water Resources Control Board (SWRCB), Division of Water Rights, issued Water Rights Order (Order) 2009-0058-DWR. The order specifies necessary terms and conditions to be carried out for WY 2010. Condition #2 of the Order states "*Any San Joaquin River water temporarily stored or routed through San Luis Reservoir shall not be delivered to south-of-Delta contractors other than Friant Division Contractors*." Reclamation is complying with this Order through the implementation of proposed transfers and exchanges of water for the ultimate delivery of San Joaquin River water from San Luis Reservoir to the Friant Division Contractors.

The Proposed Action would provide recirculated water for the Friant Division long-term contractors from SLR . It can be predicted that the Friant Division long-term contractors would not experience any loss or gain in water supply as a result of this action.

3.2 Land Use

3.2.1 Affected Environment

Fresno Irrigation District and the City of Fresno
FID and CiF are located entirely within Fresno County and includes the Fresno-Clovis metropolitan area. FID is comprised of 245,000 acres, of which 150,000 are irrigable. The main crops in FID are grapes, almonds, oranges and tangerines, alfalfa, and miscellaneous vegetables. FID delivers water to its customers through 800 miles of canals and pipelines. CiF serves municipal and industrial water supplies and does not supply irrigation water.

Tulare Irrigation District
TID encompasses 70,000 acres, of which, approximately 62,000 are irrigated. The main crops in TID are alfalfa, field corn, wheat, and cotton.

Lower Tule River Irrigation District
LTRID encompasses 161 square miles. Of the approximately 104,000 acres within LTRID, 84,500 acres are irrigated. The primary crops are alfalfa, silage, and cotton. Over 98 percent of LTRID is zoned for agricultural use by the County of Tulare (Tulare County 1964).

Tulare Lake Basin Water Storage District
TLBWSD encompasses approximately 17,700 acres. Of this amount, the majority is utilized for crop, rangeland, or pasture purposes at approximately 16,900 acres. The main crops within TLBWSD are cotton, seed alfalfa, and grain.

Arvin Edison Water Storage District
Agriculture, in the form of row crops, orchards and vineyards are the primary land use within AEWSD. Permitted agricultural uses, per the Kern County General Plan, include irrigated cropland, orchards, vineyards, horse ranches, beekeeping, and ranch/farm facilities. AEWSD also includes the City of Arvin and is located within the unincorporated communities of Edison, Lamont, Mettler, and DiGiorgio.

3.2.2 Environmental Consequences

3.2.2.1 No Action
Under the No Action Alternative, the water in SLR would not be delivered to the Friant Division contractors. This has the potential to result in land fallowing as a result of the loss of up to 60,000 AF of water which would have been used to irrigate agricultural lands. This land fallowing could result in potentially adverse impacts on agricultural land use.

3.2.2.2 Proposed Action
Under the Proposed Action, there would not be any land conversions and no land fallowing or habitat restoration would be deferred as a result of the transfer or exchange of Friant Recirculation Water. No lands would be annexed into any existing service areas to specifically use the exchanged water. Based on existing land use patterns in the area, the majority of land use is agricultural and irrigation water is provided mainly for agricultural purposes. This is not

expected to change as a result of the transfer or exchange of water under the proposal. Because the Proposed Action is for Reclamation to enter into various 12 consecutive month transfer and exchange agreements to recirculate the recaptured water to the Friant Division, this would not provide a long-term or reliable supply to support long-term land use changes. The Proposed Action represents the optimization of the use of water available from SJRRP recapture that is available in SLR. The Proposed Action will not have an impact on land use.

3.3 Biological Resources

3.3.1 Affected Environment

By the mid-1940s, most of the valley's native habitat had been altered by man, and as a result, was severely degraded or destroyed. It has been estimated that more than 85 percent of the valley's wetlands had been lost by 1939 (Dahl and Johnson 1991). When the CVP began operations, over 30 percent of all natural habitats in the Central Valley and surrounding foothills had been converted to urban and agricultural land use (Reclamation 1999). Prior to widespread agriculture, land within the Proposed Action area provided habitat for a variety of plants and animals. With the advent of irrigated agriculture and urban development over the last 100 years, many species have become threatened and endangered because of habitat loss. Of the approximately 5.6 million acres of valley grasslands and San Joaquin saltbrush scrub, the primary natural habitats across the valley, less than 10 percent remains today. Much of the remaining habitat consists of isolated fragments supporting small, highly vulnerable populations (Reclamation 1999). The Proposed Action area is dominated by agricultural habitat that includes field crops, orchards, and pasture. The vegetation is primarily crops and frequently includes weedy non-native annual and biennial plants.

Reclamation requested an official species list from the United States Fish and Wildlife Service (USFWS) through the Sacramento Field Office's website: http://www.fws.govv/sacramento/spp_lists on June 21, 2010. The list is for Fresno, Tulare, Kings, and Kern Counties in United States Geological Survey 7 ½ minute quadrangles (Appendix C), Document Number 100621071228. Species and critical habitat potentially in the Proposed Action area are included in Table 2.

Because all transfers and exchanges are occurring between the SLR and points inland through existing conveyance facilities, it can be assumed that anadramous and Delta species, such as steelhead and any species listed by National Marine Fisheries Service (NMFS) and their designated critical habitat, are outside of the Proposed Action area and are therefore not discussed further (Appendix D). Based on maps obtained from NMFS' Essential Fish Habitat (EFH) mapper: http://www.nmfs.noaa.gov/habitat/habitatprotection/efh/GIS_mapper.htm , there is no EFH designated within the Proposed Action area, therefore, EFH will not be discussed further.

3.3.2 Environmental Consequences

3.3.2.1 No Action

Under the No Action Alternative, water in SLR that would not be recirculated to the Friant Division would potentially result in evaporative loss to some degree and may be forced to spill if not delivered out of the reservoir. As this spill would occur by utilizing existing conveyance facilities, this would have no known effect to species or critical habitat in area. It is also reasonable to assume an increase in groundwater pumping in the districts as a result of the potential loss of recirculation could occur. In some areas, groundwater quality is degraded, and irrigation with this water could result in detrimental impacts to species related to selenium concentrations.

3.3.2.2 Proposed Action

The Proposed Action plans to utilize existing facilities to transfer and exchange water that will be present in SLR. As a result, there will be no disturbance of ecologically sensitive lands due to construction activities. As this is a 12 consecutive month transfer and exchange agreement to recirculate the recaptured water to the Friant Division of WY 2010 recaptured Friant Division recirculation water from the SJRRP, no land use changes will occur due to increased or decreases in cultivation activities or fallowing of fields. All water will be delivered to existing agricultural lands. As no land use changes or additional disturbance would occur as a result of the Proposed Action, no habitat changes would occur that could potentially affect species covered under the Migratory Bird Treaty Act (MBTA).

The USFWS issued a biological opinion (BO) in 2001. This BO, called the Biological Opinion on U.S. Bureau of Reclamation Long Term Contract Renewal of Friant Division and Cross Valley Unit Contractors, specifies measures the Friant water service contractors must take to avoid jeopardy to endangered and threatened species. This BO commits Reclamation to implementing a long-term plan to address the needs of listed species in the San Joaquin Valley. Reclamation will continue to coordinate with USFWS to abide by the terms of the BO for this Proposed Action.

Because there will be no disturbance or land use changes associated with this Proposed Action, there will be no effect to listed species, critical habitats, or species listed under MBTA.

Table 2: Listed Species and Critical Habitat Potentially Present in the Proposed Action Area

Species Common Name	Scientific Name	Listing Status	Designated Critical Habitat?
Conservancy fairy shrimp	*Branchinecta conservatio*	Endangered	No
Longhorn fairy shrimp	*Branchinecta longiantenna*	Endangered	Yes
Vernal pool fairy shrimp	*Branchinecta lynchi*	Threatened	Yes
Valley elderberry longhorn beetle	*Desmocerus califonicus dimporphus*	Threatened	No
Kern primrose sphinx moth	*Euproserpinus euterpe*	Threatened	No
Vernal pool tadpole shrimp	*Lepidurus packardi*	Endangered	Yes
Little Kern golden trout	*Oncorhynchus aquabonita whitei*	Threatened	Yes
Loahontan cutthroat trout	*Oncorhynchus clarki henshawi*	Threatened	No
Paiute cutthroat trout	*Oncohynchus clarki seleniris*	Threatened	No
Central Valley steelhead	*Oncorhynchus mykiss*	Threatened	No
California tiger salamander	*Ambystoma californiense*	Threatened	Yes
California red-legged frog	*Rana draytonii*	Threatened	Yes
Blunt-nosed leopard lizard	*Gambelia sila*	Endangered	No
Giant garter snake	*Thamnophis gigas*	Threatened	No
Western snowy plover	*Charadrius alexandrines nivosus*	Threatened	No
Southwestern willow flycatcher	*Empidonas traillii extimus*	Endangered	Yes
California condor	*Gymnogyps californianus*	Endangered	Yes
Least Bell's vireo	*Vireo bellii pusillus*	Endangered	No
Giant kangaroo rat	*Dipodomys lingens*	Endangered	No
Fresno kangaroo rat	*Dipodomys nitratoides exilis*	Endangered	Yes
Tipton kangaroo rat	*Dipodomys nitratoides nitradoides*	Endangered	No
Sierra Nevada bighorn sheep	*Ovis Canadensis californiana*	Endangered	No
Buena Vista Lake shrew	*Sorex ornatus relictus*	Endangered	Yes
San Joaquin kit fox	*Vulpes macrotis mutica*	Endangered	No
Mariposa pussy-paws	*Calyptridium pulchellum*	Threatened	No
San Benito evening-primrose	*Samissonia benitensis*	Threatened	No
Succulent owl's-clover	*Castilleja campestris ssp. succulenta*	Threatened	Yes
California jewelflower	*Caulanthus californicus*	Endangered	No
Hoover's spurge	*Chamaesyce hooveri*	Threatened	Yes
Springville clarkia	*Clarkia springvillensis*	Threatened	No
Palmate-bracted bird's beak	*Cordylanthus palmatus*	Endangered	No
Kern mallow	*Eremalche kernensis*	Endangered	No
San Joaquin woolly-threads	*Monolopia congdonii*	Endangered	No
Bakersfield cactus	*Opuntia treleasei*	Endangered	No
San Joaquin Vally Orcutt grass	*Orcuttia inaequalis*	Threatened	Yes
Hairy Orcutt grass	*Orcuttia pilosa*	Endangered	Yes
Hartweg's golden sunburst	*Pseudobahia bahiifolia*	Endangered	No
San Joaquin adobe sunburst	*Pseudobahia peirsonii*	Threatened	No
Keck's checker-mallow	*Sidalcea keckii*	Endangered	Yes
Yosemite toad	*Bufo canorus*	Candidate	No
Mountain yellow-legged frog	*Rana muscosa*	Candidate	No
Western yellow-billed cuckoo	*Coccyzus americanus occidentalis*	Candidate	No
Fisher	*Martes pennanti*	Candidate	No
Ramshaw sand-verbena	*Abronia alpine*	Candidate	No

3.4 Cultural Resources

Cultural resources is a broad term that includes prehistoric, historic, architectural, and traditional cultural properties. The National Historic Preservation Act (NHPA) of 1966 is the primary Federal legislation that outlines the Federal Government's responsibility to cultural resources. Section 106 of the NHPA requires the Federal Government to take into consideration the effects of an undertaking on cultural resources listed on or eligible for inclusion in the National Register of Historic Places (National Register). Those resources that are on or eligible for inclusion in the National Register are referred to as historic properties.

The San Joaquin Valley is rich in historical and prehistoric cultural resources. Cultural resources in this area are generally prehistoric in nature and include remnants of native human populations that existed before European settlement. Prior to the 18th Century, many Native American tribes inhabited the Central Valley. It is possible that many cultural resources lie undiscovered across the valley. The San Joaquin Valley supported extensive populations of Native Americans, principally the Northern Valley Yokuts, in the prehistoric period. Cultural studies in the San Joaquin Valley have been limited. The conversion of land and intensive farming practices over the last century has probably disturbed many Native American cultural sites.

3.4.1 Affected Environment

Resources within the scope of this project include historic features of the built environment primarily those of the CVP and SWP. Components of the CVP have been determined eligible for inclusion in the National Register and have been prepared for inclusion in the National Register through a multiple property nomination. The CVP multiple property nomination is currently being reviewed for submission to the Keeper of the National Register for inclusion in the National Register.

Friant Dam is located on the San Joaquin River, 25 miles northeast of Fresno, California. Completed in 1942, the dam is a concrete gravity structure, 319 feet high, with a crest length of 3,488 feet. The FKC carries water over 151.8 miles in a southerly direction from Millerton Lake to the Kern River, four miles west of Bakersfield. The water is used for supplemental and new irrigation supplies in Fresno, Tulare, and Kern Counties. Construction of the canal began in 1945 and was completed in 1951. Both Friant Dam and the FKC are considered contributing elements of the CVP multiple property listing and are considered eligible for inclusion in the National Register.

3.4.2 Environmental Consequences

3.4.2.1 No Action

Under the No Action Alternative, there would be no Federal undertaking as described in the in the NHPA at Section 301(7). As a result, Reclamation would not be obligated to implement Section 106 of that NHPA and its implementing regulations at 36 CFR Part 800. Because there is no undertaking, impacts to cultural resources would not be evaluated through the Section 106 process. All operations would remain the same resulting in no impacts to cultural resources.

3.4.2.2 Proposed Action
Transferring water as described in the Proposed Action is an undertaking as described in Section 301(7) of the NHPA, initiating Section 106 of the NHPA and its implementing regulations at 36 CFR Part 800. All transfers would occur through existing facilities and water would be provided within existing service area boundaries to areas that currently use CVP water. The Proposed Action would not result in modification of any existing facilities, construction of new facilities, change in land use, or growth. This action has no potential to cause effect to historic properties pursuant to the regulations at 36 CFR Part 800.3(a)(1). As a result, the proposed undertaking would result in no impacts to cultural resources.

3.5 Indian Trust Assets

3.5.1 Affected Environment
ITA are legal interests in assets that are held in trust by the U.S. Government for federally recognized Indian tribes or individuals. The trust relationship usually stems from a treaty, executive order, or act of Congress. The Secretary of the Interior is the trustee for the United States on behalf of federally recognized Indian tribes. “Assets” are anything owned that holds monetary value. “Legal interests” means there is a property interest for which there is a legal remedy, such a compensation or injunction, if there is improper interference. ITA can not be sold, leased or otherwise alienated without the United States’ approval. Assets can be real property, physical assets, or intangible property rights, such as a lease, or right to use something; which may include lands, minerals and natural resources in addition to hunting, fishing, and water rights. Indian reservations, rancherias, and public domain allotments are examples of lands that are often considered trust assets. In some cases, ITA may be located off trust land.

Reclamation shares the Indian trust responsibility with all other agencies of the Executive Branch to protect and maintain ITA reserved by or granted to Indian tribes, or Indian individuals by treaty, statute, or Executive Order.

3.5.2 Environmental Consequences

3.5.2.1 No Action
Under the No Action Alternative, Reclamation would not approve the transfers and conditions would remain the same as existing conditions; therefore, there would be no impacts to ITA.

3.5.2.2 Proposed Action
Approval of the transfers and exchanges between districts would not involve any construction and would utilize existing conveyance facilities. The Proposed Action is outside of the nearest ITA, which is located at Santa Rosa Rancheria, approximately 7 miles north of the project. Therefore, activities associated with the Proposed Action would not impact ITA.

3.6 Socioeconomic Resources

3.6.1 Affected Environment
The majority of the service areas within the Proposed Action area are rural and agricultural. The agricultural industry significantly contributes to the overall economic stability of the San Joaquin

Valley. There are many small communities were farm workers live, and many small businesses that support the agricultural industry. These communities and businesses rely on the efficient and cost-effective utilization and supply of water to the surrounding agricultural lands to sustain the agriculturally-based economy. Depending upon the variable hydrologic and economic conditions, water transfers and exchanges can be prompted. Economic variances in the community may include fluctuating agricultural prices, insect infestation, changing hydrologic conditions, increased fuel and power costs. The cost and availability of water has historically had a direct secondary economic impact on the communities of the area as it can drive the type of crop grown or contribute to the potential fallowing of land.

3.6.2 Environmental Consequences

3.6.2.1 No Action
Under the No Action Alternative, economic conditions in the vicinity of the Proposed Action area could worsen. If the release of water from SLR back to the Friant Division was not carried out, the surrounding community could suffer from the result of up to a 60,000 AF shortfall of water for WY 2010. This may be significant enough to take agricultural land out of production, thus decreasing the need for farm labor and small business support from the local community. The economic impacts of reduced agricultural production could adversely impact the affected environment.

3.6.2.2 Proposed Action
The Proposed Action would assist in sustaining existing agricultural production and allow for water deliveries to be made within the existing districts. This would help maintain the stability of the agricultural market and economical vitality for the San Joaquin Valley to a certain degree. The transfers are temporary actions and would not result in long-term increases in water supplies that would encourage urbanization, construction or other land-disturbing activities. The Proposed Action will not have an impact on socioeconomic resources.

3.7 Environmental Justice

3.7.1 Affected Environment
The February 11, 1994, Executive Order 12898 requires all federal agencies to address potentially disproportionate impacts to economically disadvantaged and minority populations.

Many cities and towns in the San Joaquin Valley are steeped in the agricultural community, and include high percentages of minority and/or low-income populations. Some of these communities support centers of migrant laborers, and populations tend to increase during the late summer harvest. The San Joaquin Valley’s migrant workers are typically of Hispanic origin, from Mexico and Central America. Migrant workers depend exclusively on seasonal agricultural practices to provide sufficient income to support themselves and their families. The agricultural industry and agricultural businesses are the main industry in the Proposed Action area, and thus, are the main industries to provide employment opportunities for minority and/or disadvantaged populations.

3.7.2 Environmental Consequences

3.7.2.1 No Action

The No Action Alternative could result in an adverse impact to minority and/or disadvantaged populations within the vicinity of the Recipient Districts because lands could be taken out of production if up to 60,000 AF of water was not released from SLR to provide irrigation to agricultural lands. This could potentially result in the fallowing of lands, and subsequently the loss of jobs in the local community.

3.7.2.2 Proposed Action

The Proposed Action would not disproportionately impact economically disadvantaged or minority populations. Water transfers, which would allow water in SLR to be utilized within the Friant Division in WY 2010, would allow the continued irrigation of agricultural lands in the Proposed Action area. This would result in neither employment gain nor loss, but rather in sustained job rates and would not create an overall change in the area. The Proposed Action would reduce dislocation and promote continued employment within the affected environment and would not disproportionately impact economically disadvantaged or minority populations. Agricultural unemployment rates in the Fresno, Tulare, Kings, and Kern Counties suggest that any actions that maintain seasonal jobs should be considered beneficial.

3.8 Air Quality

Section 176 (c) of the Clean Air Act (CAA) (42 U.S.C. 7506 (c)) requires that any entity of the Federal government that engages in, supports, or in any way provided financial support for, licenses or permits, or approves any activity to demonstrate that the action conforms to the applicable State Implementation Plan (SIP) required under Section 110 (a) of the CAA (42 U.S.C. 7401 (a)) before the action is otherwise approved. In this context, conformity means that such federal actions must be consistent with a SIP's purpose of eliminating or reducing the severity and number of violations of the National Ambient Air Quality Standards and achieving expeditious attainment of those standards. Each federal agency must determine that any action that is proposed by the agency and that is subject to the regulations implementing the conformity requirements will, in fact conform to the applicable SIP before the action is taken.
On November 30, 1993, the Environmental Protection Agency promulgated final general conformity regulations at 40 CFR 93 Subpart B for all federal activities except those covered under transportation conformity. The general conformity regulations apply to a proposed federal action in a non-attainment or maintenance area if the total of direct and indirect emissions of the relevant criteria pollutants and precursor pollutant caused by the Proposed Action equal or exceed certain *de minimis* amounts thus requiring the federal agency to make a determination of general conformity.

3.8.1 Affected Environment

The project area is located within the San Joaquin Valley Air Basin (SJVAB) which is the second largest air basin in California. Despite years of improvements, the SJVAB does not meet State and Federal health-based air quality standards. The governing body over the SJVAB, the San Joaquin Valley Air Pollution Control District (SJVAPCD), has adopted stringent control measures to reduce emissions and improve overall air quality within the SJVAB.

3.8.2 Environmental Consequences

3.8.2.1 No Action

Under the No Action Alternative, it would be reasonable to assume an increase in groundwater pumping in the districts as a result of the potential loss of 60,000 AF of Friant recirculation water. This could contribute to a greater release of emissions associated with combustion of fossil fuels, and thus, impacts to air quality.

3.8.2.2 Proposed Action

Under the Proposed Action, movement of water between districts and exchange partners would be done via gravity flow and/or pumped using electric motors which have no emissions. The air quality emissions from electrical power have been considered in environmental documentation for the generating power plant. There are no emissions from electrical motors and therefore a conformity analysis is not required under the CAA and there would be no impact on air quality. The Proposed Action would not involve any construction or land disturbing activities that could lead to fugitive dust emissions and/or exhaust emissions associated with the operations of heavy machinery.

3.9 Global Climate Change

3.9.1 Affected Environment

Climate change refers to significant change in measures of climate that last for decades or longer. Many environmental and anthropogenic factors can contribute to climate change, including the burning of fossil fuels, deforestation, changes in ocean currents, urbanization, etc.). Carbon dioxide, which is produced when fossil fuels are burned, is a greenhouse gas (GHG) that effectively traps heat in the lower atmosphere. Some carbon dioxide is liberated naturally, but this may be augmented greatly through human activities.

Increases in air temperature may lead to changes in precipitation patterns, runoff timing and volume, sea level rise, and changes in the amount of irrigation water needed due to modified evapotranspiration rates. Approximately 20 million Californians rely on the CVP and SWP for water deliveries. Global shifts related to climate change may lead to impacts to California's water resources and project operations.

3.9.2 Environmental Consequences

3.9.2.1 No Action Alternative

Under the No Action Alternative, it would be reasonable to assume an increase in groundwater pumping in the districts as a result of the potential loss of 60,000 AF of Friant recirculation water. This could contribute to a greater release of emissions, and thus GHGs, associated with combustion of fossil fuels and would impact air quality.

3.9.2.2 Proposed Action

GHG generated by a project is expected to be extremely small compared to sources contributing to potential climate change since the transfer of water would be conveyed mostly via gravity and little, if any, additional pumping from electric motors would be required. While any increase in

GHG emissions would add to the global inventory of gases that would contribute to global climate change, the Proposed Action would result in potentially minimal increases in GHG emissions and a net increase in GHG emissions among the pool of GHG would not be detectable.

3.10 Cumulative Impacts

Contract execution for the transfer and exchange of water within the CVP and through the Friant Division would not have any controversial or highly uncertain effects, or involve unique or unknown environmental risks. The Proposed Action would not trigger other water service actions and does not contribute to cumulative effects to physical resources when added to other water service actions. The canals, distribution, rivers, creeks, and conveyance facilities in the San Joaquin Valley associated with the Proposed Action are managed primarily for agricultural supplies. The Proposed Action would not interfere with the deliveries, operations, or cause substantial adverse changes to the conveyance facilities.

The remainder of the SJRRP actions, including the continued release of future flows from Friant Dam, the recapture of flows at specific San Joaquin River diversion and/or pumping facilities, and future site-specific actions are all reasonably foreseeable and required under the Settlement and the Act. Future program actions related to the SJRRP will be addressed in a Program Environmental Impact Statement/Environmental Impact Report, which is scheduled to have a public draft released in the summer of 2010. Areas of potential concern, such as water supply impacts, recapture mechanisms, and cumulative impacts will be discussed within this program document. A Draft Supplemental EA was released on June 11, 2010 for a continuation of the 1-year Interim Flows action, as described in the WY 2010 Interim Flows EA. This document is being prepared for a 12 consecutive month transfer and exchange agreements to recirculate the recaptured water to the Friant Division. WY 2011 flows will potentially be released from Friant Dam during the time that WY 2010 recaptured flows are being recirculated back to the Friant Division contractors. However, the total amount of water transferred would not increase beyond the 60,000 AF quantity analyzed in this document for WY 2010. WY 2011 recirculation would be analyzed by a separate environmental process, similar to this one. It is speculation to assume what type of contracts, transfers, or exchanges will occur for WY 2011 or what quantities would be available for transfer based on water year type designation.

The proposed transfers, when added to other actions, do not contribute to significant increases or decreases in environmental conditions. These water service actions are proposed to occur only to distribute up to 60,000 AF out of SLR, and are short-term. These transfer actions are not precedent-setting. The Proposed Action was found to have no impact on water resources, land use, biological resources, cultural resources, ITA, socioeconomic resources, environmental justice, air quality, or global climate change and therefore there is no contribution to cumulative impacts on these resources areas. Overall, there would be no cumulative impacts caused by the Proposed Action.

Section 4 Consultation and Coordination

4.1 National Environmental Policy Act

This EA has been prepared pursuant to NEPA, which was signed into law in 1969 (42 USC Section 4321 et seq.). In addition, it was prepared in accordance with CEQ regulations for implementing NEPA, 40 CFR Parts 1500- 1508, and General Services Administration (GSA) Order ADM 1095.1F. NEPA provides a commitment that Federal agencies will consider the environmental effects of their proposed actions and adhere to regulations, policies, and programs to the fullest extent possible, in accordance with NEPA's policies of environmental protection. This EA assesses if the Proposed Action would cause any significant environmental effects. If it is determined that the Proposed Action would have no significant environmental effects, a FONSI will be signed.

4.2 Fish and Wildlife Coordination Act of 1934 (16 USC § 661 et seq.)

The Fish and Wildlife Coordination Act (FWCA) requires that Reclamation consult with fish and wildlife agencies (federal and state) on all water development projects that could affect biological resources. The Proposed Action does not involve federal water development projects; therefore, the FWCA does not apply.

4.3 Endangered Species Act of 1973 (16 USC § 1531 et seq.)

Section 7 of the ESA requires Federal agencies, in consultation with the Secretary of the Interior, to ensure that their actions do not jeopardize the continued existence of endangered or threatened species, or result in the destruction or adverse modification of the critical habitat of these species.

The Proposed Action would not change the land use patterns of the cultivated or fallowed fields that do have some value to listed species. In addition, the short duration of the water availability, the requirement that no native lands be converted without consultation with the USFWS, and the stringent requirements for transfers under applicable laws would prevent any adverse impact to any federally listed species or any critical habitat.

4.4 National Historic Preservation Act (16 USC § 470 et seq.)

The National Historic Preservation Act (NHPA) of 1966, as amended, is the primary legislation that outlines the Federal government's responsibility to cultural resources. Cultural resources include both archaeological and built environment resources. Section 106 of the NHPA requires that Federal agencies take into consideration the effects of their undertakings on historic properties. Historic properties are cultural resources that are listed on or eligible for inclusion in the National Register of Historic Places (National Register). The 36 CFR Part 800 regulations implement Section 106 of the NHPA and outline the procedures necessary for compliance with the NHPA.

Compliance with the Section 106 process follows a series of steps that are designed to identify if cultural resources are present and to what level they will be affected by the proposed Federal undertaking. The Federal agency must first determine if the proposed action is the type of action that has the potential to affect historic properties. Once that has been determined and an action, or undertaking, has been identified, the Federal agency must identify interested parties, determine the area of potential effect (APE), conduct cultural resource inventories, determine if historic properties are present within the APE, and assess effects on any identified historic properties. The Federal agency consults with the State Historic Preservation Officer (SHPO) on agency determinations and findings and seeks their concurrence with the Federal agency findings.

For the No Action and three proposed alternatives, there will be no modification to existing facilities, no ground disturbance, and no new construction. There will be no new land use or new irrigation to agricultural as a result of the Proposed Action. Therefore, there will be no potential to affect historic properties pursuant to 36 CFR 800.3(a)(1).

4.5 Migratory Bird Treaty Act of 1918 (16 USC § 703 et seq.)

The MBTA implements various treaties and conventions between the U.S. and Canada, Japan, Mexico and the former Soviet Union for the protection of migratory birds. Unless permitted by regulations, the MBTA provides that it is unlawful to pursue, hunt, take, capture or kill; attempt to take, capture or kill; possess, offer to or sell, barter, purchase, deliver or cause to be shipped, exported, imported, transported, carried or received any migratory bird, part, nest, egg or product, manufactured or not. Subject to limitations in the MBTA, the Secretary of the Interior may adopt regulations determining the extent to which, if at all, hunting, taking, capturing, killing, possessing, selling, purchasing, shipping, transporting or exporting of any migratory bird, part, nest or egg will be allowed, having regard for temperature zones, distribution, abundance, economic value, breeding habits and migratory flight patterns.

The Proposed Action would not change the land use patterns of the cultivated or fallowed fields that do have some value to listed species or birds protected by the MBTA; therefore, the Proposed Action would have no effect on birds protected by the MBTA.

4.6 Executive Order 113007 and American Indian Religious Freedom Act of 1978 – Indian Trust Assests and Sacred Sites on Federal Lands

Executive Order 113007 and the American Indian Religious Freedom Act of 1978 are designed to protect Indian Trust Assets, accommodates acces and ceremonial use of Native American sacred sites by Native American religious practitioners, avoid adversely affecting the physical integrity of such sacred sites, and protect and preserve the observance of traditional Native American religions. The Proposed Action would not violate these protections.

4.7 Executive Order 12898 – Environmental Justice in Minority and Low-Income Populations

Executive Order 12898 requires Federal agencies to identify and address disproportionately high and adverse human health and environmental effects of Federal programs, policies, and activities on minority and low-income populations. The Proposed Action has been assessed for potential environmental, social, and economic impacts on minority and low-income populations. Minority and low-income populations would not be disproportionately exposed to adverse effects relative to the benefits of the action.

4.8 Central Valley Project Improvement Act

Reclamation's evolving mission was written into law on October 30, 1992, in the form of Public Law 102-575, the Reclamation Projects Authorization and Adjustment Act of 1992. Included in the law was Title 34, the CVPIA. The CVPIA amended previous authorizations of the CVP to include fish and wildlife protection, restoration, and mitigation as project purposes having equal priority with irrigation and domestic water supply uses, and fish and wildlife enhancement as having equal priority with power generation. The Proposed Action is consistent with CVPIA.

4.9 Central Valley Project Long-Term Water Service Contracts

In accordance with CVPIA Section 3404c, Reclamation is renegotiating long-term water service contracts. As many as 113 CVP water service contracts locations within the Central Valley of California may be renewed during this process. The Proposed Action is consistent with CVP long-term water service contracts.

4.10 State Water Resources Control Board Temporary Water Transfer Approval

Pursuant to Section 1725 et seq. of the California State Water Code, a permittee or licensee who proposes a temporary transfer of water (less than 1 year) shall submit to the SWRCB a petition to change the terms of the permit or license, as required, to accomplish the proposed temporary change. Such a petition will be filed, with a petition pursuant to Section 1707, to add a purpose of use, to add points of rediversion, and to add the San Joaquin River for the place of use for instream flows. SWRCB requires approval of a petition for the pusposes of use due to a transfer or exchange of water, and will approve a petition under section 1725 – if the transfer would only involve the amount of water that would have been consumptively used or stored by the permittee or licensee in the absence of the proposed temporary change; would not injure any legal user of the water; and would not unreasonably affect fish, wildlife, or other instream beneficial uses. A Water Rights Order for WY 2011 will be obtained, which will allow recapture and recirculation of the Friant water from October 1, 2010 through September 30, 2011. This approval is anticipated prior to the release of WY 2011 flows commencing on October 1, 2010.

Reclamation obtained a Water Rights Order (Order WR 2009-0058-DWR) from the SWRCB for the temporary transfer of water to add a purpose of use; to add points of rediversion; and to add the San Joaquin River for the place of use for instream flows for the WY 2010 Interim Flows, from October 1, 2009 through September 30, 2010.

Section 5 List of Preparers and Reviewers

Valerie Curley, Supervisory Repayment Specialist, SCCAO
Michelle Banonis, Natural Resources Specialist, San Joaquin River Restoration Program
David Mooney, Program Engineer, San Joaquin River Restoration Program
Adam Nickels, Archaeologist, Mid-Pacific Region
Patricia Rivera, Tribal Liason, Mid-Pacific Region

Section 6 References

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Reclamation (U.S. Bureau of Reclamation) June 17, 2010. Letter to Friant Division Board of Directors titled *Results of Scenario Review for the Recirculation of Friant Recaptured Water Stored in San Luis Reservoir (Recirculation) – San Joaquin River Restoration Program – Central Valley Project – Friant Division*

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United States Department of the Interior

BUREAU OF RECLAMATION
Mid-Pacific Regional Office
2800 Cottage Way
Sacramento, California 95825-1898

IN REPLY REFER TO: MP-460
WTR-4.10

JUN 28 2010

Ms. Victoria A. Whitney
Deputy Director for Water Rights
Attn: Ms. Katherine Mrowka
State Water Resources Control Board
P.O. Box 2000
Sacramento, CA 95812-2000

Subject: Compliance with Condition 2 of Order WR 2009-0058-DWR, Permitted Applications 234, 1465, and 5638, Central Valley Project, California

Dear Ms. Whitney:

On October 1, 2009, the Division of Water Rights (Division) issued Order WR 2009-0058-DWR (Order). Condition 2 of the Order states the following.

> "Any San Joaquin River water temporarily stored or routed through San Luis Reservoir shall not be delivered to south-of-Delta contractors other than Friant Division Contractors."

The purpose of this letter is to inform the Division that the Bureau of Reclamation is complying with Condition 2 of the Order. Reclamation is doing so through the implementation of proposed transfers and exchanges of water for the ultimate delivery of San Joaquin River water from San Luis Reservoir to the Friant Division Contractors. In accordance with the compliance reporting requirements presented in Term 17 of the Order, Reclamation will report to the Division the quantity of water stored or routed through San Luis Reservoir pursuant to the Order as well as the quantity of such water subsequently delivered to the Friant Division Contractors by means of transfers and exchanges.

If you have any questions regarding this matter, please contact Mr. Bob Colella, Water Rights Specialist, at 916-978-5256 or email rcolella@usbr.gov.

Sincerely,

/s/ RICHARD J. WOODLEY

Richard J. Woodley
Regional Resources Manager

bc: Regional Solicitor, Pacific Southwest Region
Attention: Amy Aufdemberge
MP-460 (RColella)
MP-170 (JPhillips)
SCCAO-440 (VCurley)
CVO-400 (PFujitani)

WBR:RColella:CMunoz:6/23/2010:916-978-5256
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Surnaming: MP-170, CVOO-400, MP-460(2), 1150(AA), MP-400

Attachment 2:

Proposed Assistance Agreement with Lower San Joaquin Levee District and Related Correspondence

7-2279 (05-22-09)
Bureau of Reclamation

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
ASSISTANCE AGREEMENT

1A. AGREEMENT NUMBER	1B. MOD NUMBER	2. TYPE OF AGREEMENT	3. CLASS OF RECIPIENT
R10AC20009		[ ] GRANT [X] COOPERATIVE AGREEMENT	Special District

4. ISSUING OFFICE (NAME, ADDRESS)	5. RECIPIENT (NAME, ADDRESS, TELEPHONE)
Bureau of Reclamation Mid Pacific Region 2800 Cottage Way Sacramento, California 95825	Lower San Joaquin Levee District 11704 West Henry Miller Avenue Dos Palos, California 93620 Phone: (209) 387-4545

EIN #:	770256884	County:	Merced
DUNS #:	006010375	Congress. Dist:	18, 19, 20, 21

6. ADMINISTRATIVE POINT OF CONTACT (NAME, ADDRESS, TELEPHONE, E-MAIL)	7. RECIPIENT PROJECT MANAGER (NAME, ADDRESS, TELEPHONE, E-MAIL)
Jeff Palachat, MP 3818 Bureau of Reclamation Mid Pacific Region 2800 Cottage Way Sacramento, California 95825 Phone: (916) 978-5146 Email: spalachat@usbr.gov	Reggie Hill Lower San Joaquin Levee District 11704 West Henry Miller Avenue Dos Palos, California 93620 Phone: (209) 387-4545 Email: lsjld@elite.net

8. GRANTS OFFICER TECHNICAL REPRESENTATIVE (NAME, ADDRESS, TELEPHONE, E-MAIL)	9A. INITIAL AGREEMENT EFFECTIVE DATE:	9B. MODIFICATION EFFECTIVE DATE:
David Mooney, MP 170 Bureau of Reclamation Mid Pacific Region 2800 Cottage Way Sacramento, California 95825 Phone: (916) 978-5458 Email: dmmooney@usbr.gov	See block 17a 10. COMPLETION DATE September 30, 2010	

11. PROGRAM STATUTORY AUTHORITY	CFDA
Omnibus Public Land Management Act of 2009, Title X, Subtitle A, Public Law 111-11, 42 USC 10004(b)(2)	15.507

12. FUNDING INFORMATION	RECIPIENT/OTHER	RECLAMATION
Total Estimated Amount of Agreement	$0.00	$184,833.64
This Obligation	$0.00	$184,833.64
Previous Obligation	$0.00	$ 0.00
Total Obligation	$0.00	$184,833.64
Cost-Share %		

13. REQUISITION NUMBER
10201300001

14A. ACCOUNTING AND APPROPRIATION DATA
H37 1591 2592 001 04 0 0 2013000 252R 411C

14B. TREASURY ACCOUNT FUNDING SYMBOL
14.0680

15. PROJECT TITLE AND BRIEF SUMMARY OF PURPOSE AND OBJECTIVES OF PROJECT
Operation and Maintenance of Flood Project Facilities Impacted By San Joaquin River Restoration

16a. Acceptance of this Assistance Agreement in accordance with the terms and conditions contained herein is hereby made on behalf of the above-named recipient	17a. Award of this Assistance Agreement in accordance with the terms and conditions contained herein is hereby made on behalf of the United States of America, Bureau of Reclamation
BY: ____________ DATE: ____________	BY: ____________ DATE: ____________
16b. NAME, TITLE, AND TELEPHONE NUMBER OF SIGNER Additional signatures are attached	17b. NAME OF GRANTS OFFICER

DOCUMENTS INCORPORATED HEREIN BY REFERENCE:

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Cooperative Agreement
Between
Bureau of Reclamation
And
Lower San Joaquin Levee District
For
Operation and Maintenance of Flood Project Facilities Impacted By San Joaquin River Restoration

I. OVERVIEW AND SCHEDULE

1. AUTHORITY

This Cooperative Agreement (Agreement) is entered into between the United States of America, acting through the Department of Interior, Bureau of Reclamation, hereinafter referred to as "Reclamation", and Lower San Joaquin Levee District, hereinafter referred to as the "Recipient", pursuant to Omnibus Public Land Management Act of 2009, Title X, Subtitle A, Public Law 111-11, 42 USC 10004(b)(2).

2. PUBLIC PURPOSE

The Lower San Joaquin Levee District (LSJLD) operates and maintains a flood control system financially supported through landowner assessments. The change in operations at Friant Dam may result in increased operation and maintenance costs due to additional flow in the river and bypass system at different times than historical patterns.

3. BACKGROUND AND OBJECTIVES

In 1988, a coalition of environmental groups led by the Natural Resources Defense Council (NRDC), filed a lawsuit challenging the renewal of long-term water service contracts between the United States and the Central Valley Project Friant Division contractors (Friant Districts), *NRDC et al. v. Kirk Rodgers et al*. Case No. CIV S-88-1658 LKK/GGH. On September 13, 2006, after more than 18 years of litigation, NRDC, Friant Water Users Authority (FWUA), and the U.S. Departments of the Interior and Commerce agreed on terms and conditions for a Stipulation of Settlement (Settlement) with two goals:

- **Restoration** – To restore and maintain fish populations in "good condition" in the mainstem San Joaquin River below Friant Dam to the confluence of the Merced River, including naturally reproducing and self-sustaining populations of salmon and other fish; and
- **Water Management** – To reduce or avoid adverse water supply impacts on all of the Friant Division long-term contractors that may result from the Interim Flows and Restoration Flows.

The objective of the Lower San Joaquin Levee District Water Year 2010 Interim Flow Operation and Maintenance agreement is to provide financial assistance for changes in flood control costs as a result of the first year release of Interim Flows. Implementing activities associated with the San Joaquin River

Restoration Program (SJRRP) for operations and maintenance costs required to release and route Interim Flows without impacting performance of the flood control system.

4. PERIOD OF PERFORMANCE AND FUNDS AVAILABILITY

This Agreement becomes effective on the date shown in Block 17a of Form 7-2279, United States of America, Department of the Interior, Bureau of Reclamation, Assistance Agreement. The Agreement shall remain in effect until the date shown in Block 10 of Form 7-2279, United States of America, Department of the Interior, Bureau of Reclamation, Assistance Agreement. The period of performance for this Agreement may only be modified through written modification of the Agreement by a Reclamation Grants Officer (GO).

Pursuant to the Act of Congress of June 17, 1902 (32 Stat. 388), and acts amendatory thereof or supplementary thereto, all commonly known as Reclamation Law, funds for payment under this Agreement are included in Public Law 111-85, Energy and Water Development and Related Agencies Appropriations Act, 2010. Funding for any optional year of the Agreement is contingent upon subsequent Congressional funding.

Reclamation has $184,833.64 available for this Agreement. The Government's obligation under this Agreement is contingent upon the availability of appropriated funds from which payment for Agreement purposes can be made. No legal liability on the part of the Government for any payment may arise until funds are made available to the GO for this Agreement, and until the Recipient receives notice of such availability through formal modification of this Agreement by the GO.

5. SCOPE OF WORK

The Lower San Joaquin Levee District will be responsible for additional operation and maintenance activities as a result of the release of Water 2010 Interim Flows. The Levee District is responsible for operation and maintenance of the flood control system under existing conditions and has well developed practices for responding to flood control events. The scope of the agreement includes activities undertaken in excess of those likely to occur in the absence of restoration flows and relies on exiting maintenance practices and standards. The following subsections describe tasks.

5.1 Water Year 2010 Fall LSJLD Operations and Maintenance

A draft interim report of the activities undertaken for maintenance as a result of water year 2010 Fall Interim Flows will be submitted by February 27, 2010 in electronic Microsoft word and/or Excel format and 3 hard copies to:

Program Manager
San Joaquin River Restoration Program
2800 Cottage Way (MP-170)
Sacramento, CA 95825

Information in the report will include type and quantity of actions taken or hours expended in fulfilling activities under this agreement. This report provides a template for coordinating comments and feedback from SJRRP staff but no updates will be required during this task. Contents of the report should include the following subtasks.

5.1.1 Flapgate Inspection

Flapgate inspection includes verifying that each gate is closed prior to the release of flows in order to prevent flooding of surrounding lands. Patrols should be conducted according to standard LSJLD practices.

Activities will be documented in the WY 2010 Fall LSJLD Operations and Maintenance Report

5.1.2 Operation of Control Structures

Operation of control structures will permit the routing of Interim Flows and emergency actions to redirect flows in the case of unanticipated impacts. Operations will include Chowchilla Bypass Bifurcation Structure, Eastside Bypass Control Structure, and Mariposa Bypass Control Structure. Flow routing needs are described in the WY 2010 Interim Flows Environmental Assessment.

Activities will be documented in the WY 2010 Fall LSJLD Operations and Maintenance Report

5.1.3 Patrol of Levees

Levee patrols are required when inundation reaches the toe of a levee. Patrols will be conducted to identify potential issues with levee stability that require adjusting flows. Results will be reported directly to Friant Operations Staff according to emergency procedures developed during flood control operations.

Activities will be documented in the WY 2010 Fall LSJLD Operations and Maintenance Report

5.1.4 Assessment of Maintenance

The assessment of maintenance activities will include inspection of flapgates, structures, and channels to identify potential needs as a result of WY 2010 Interim Flows.

Activities will be documented in the WY 2010 Fall LSJLD Operations and Maintenance Report

5.1.5 Removal of Debris

Debris moved into flapgates or control structures as a result of WY2010 Interim Flows requires removal and disposal following standard LSJLD practices.

Activities will be documented in the WY 2010 Fall LSJLD Operations and Maintenance Report

5.1.6 SJRRP Reporting and Coordination

The LSJLD will meet with SJRRP program staff at the LSJLD headquarters at least once to present activities and receive comments on the interim report.

5.2 Water Year 2010 LSJLD Operations and Maintenance

A final report of the activities undertaken for maintenance as a result of water year 2010 Interim Flows will be submitted by September 30, 2010 in electronic Microsoft word and/or Excel format and 3 hard copies to:

Program Manager
San Joaquin River Restoration Program
2800 Cottage Way (MP-170)
Sacramento, CA 95825

Information in the report will include type and quantity of actions taken or hours expended in fulfilling activities under this agreement. The report should include fall period activities and incorporate comments from coordination with SJRRP staff during the fall period. Reporting will include 14 calendar days for SJRRP comments between an administrative draft and final version. Contents of the report should include the following subtasks.

5.2.1 Flapgate Inspection

This sub-task is similar to the fall period and activities will be documented in the WY 2010 LSJLD Operations and Maintenance Report

5.2.2 Operation of Control Structures

This sub-task is similar to the fall period and activities will be documented in the WY 2010 LSJLD Operations and Maintenance Report

5.2.3 Patrol of Levees

This sub-task is similar to the fall period and activities will be documented in the WY 2010 LSJLD Operations and Maintenance Report

5.2.4 Assessment of Maintenance

This sub-task is similar to the fall period and activities will be documented in the WY 2010 LSJLD Operations and Maintenance Report

5.2.5 Removal of Debris

This sub-task is similar to the fall period and activities will be documented in the WY 2010 LSJLD Operations and Maintenance Report

5.2.6 Control Vegetation

An increase in vegetation growth and the associated impacts on flood control stage may require spraying or mechanical removal. The LSJLD will follow standard practices to manage vegetation in impacted areas.

Activities will be documented in the WY 2010 LSJLD Operations and Maintenance Report.

5.2.7 Excavate Sand

Mobilization of sand into constricted areas risk flood control capacity and requires excavation. The LSJLD will excavate material according to standard maintenance practices.

Activities will be documented in the WY 2010 LSJLD Operations and Maintenance Report.

5.2.8 SJRRP Reporting and Coordination

The LSJLD will meet twice with SJRRP program staff at the LSJLD headquarters to present activities and receive comments on the report.

6. RESPONSIBILITY OF THE PARTIES

6.1 Recipient Responsibilities

6.1.1 The Recipient shall be responsible for carrying out the Scope of Work in accordance with the terms and conditions stated herein. The Recipient shall adhere to Federal, state, and local laws, regulations, and codes, as applicable, and shall obtain all required approvals and permits. If applicable, the Recipient shall also coordinate and obtain approvals from site owners and operators.

6.1.2 The Lower San Joaquin Levee District is responsible for:

- Completion of the tasks and deliverables identified in the statement of work.
- Providing timely reports and invoices for work performed.
- Managing the schedule and budget not to exceed the authorization for the agreement.
- Notifying Reclamation as soon as possible of any issues or constraints that would impede or inhibit successful completion of the Statement of Work.

6.2 Reclamation Responsibilities

Substantial involvement between Reclamation and the Recipient is anticipated during the performance of this Agreement. In support of this Agreement, Reclamation will provide the following:

6.2.1 Reclamation is responsible for:

- Funding and providing timely payment of monthly invoices
- Providing direction and input on tasks and deliverables
- Responding to issues or constraints that would inhibit or impede the successful completion of the Statement of Work
- Coordination with implementing agencies on issues impacting execution of the Settlement.

7.2 Cost Sharing Requirement

The Recipient will provide cost-share for this project equal to but not less than __0_% .

7.3 Pre-Award Incurrence of Costs

The Recipient shall be entitled to have incurred costs for this Agreement for allowable costs incurred on or after N/A, which if had been incurred after this Agreement was entered into, would have been allowable, allocable, and reasonable under the terms and conditions of this Agreement.

7.4 Allowable Costs (2 CFR Part §225)

Costs incurred for the performance of this Agreement must be allowable, allocable to the project, and reasonable. The following Office of Management and Budget (OMB) Circular, codified within the Code of Federal Regulations (CFR), governs the allowability of costs for Federal financial assistance:

2 CFR Part 225 (OMB Circular A-87), "Cost Principles for State, Local, and Indian Tribal Governments"

Expenditures for the performance of this Agreement must conform to the requirements within this Circular. The Recipient must maintain sufficient documentation to support these expenditures. Questions on the allowability of costs should be directed to the GO responsible for this Agreement.

The Recipient shall not incur costs or obligate funds for any purpose pertaining to operation of the program or activities beyond the expiration date stated in the Agreement. The only costs which are authorized for a period of up to 90 days following the project performance period are those strictly associated with closeout activities for preparation of the final report.

7.5 Changes (43 CFR §12.70).

(a) *General.* Grantees and subgrantees are permitted to rebudget within the approved direct cost budget to meet unanticipated requirements and may make limited program changes to the approved project. However, unless waived by the awarding agency, certain types of post-award changes in budgets and projects shall require the prior written approval of the awarding agency.

(b) *Relation to cost principles.* The applicable cost principles (see 43 §12.62) contain requirements for prior approval of certain types of costs. Except where waived, those requirements apply to all grants and subgrants even if paragraphs (c) through (f) of this section do not.

(c) *Budget changes.*

(1) *Nonconstruction projects.* Except as stated in other regulations or an award document, grantees or subgrantees shall obtain the prior approval of the awarding agency whenever any of the following changes is anticipated under a nonconstruction award:

(i) Any revision which would result in the need for additional funding.

(ii) Unless waived by the awarding agency, cumulative transfers among direct cost categories, or, if applicable, among separately budgeted programs, projects, functions, or activities which exceed or are expected to exceed ten percent of the current total approved budget, whenever the awarding agency's share exceeds $100,000.

(iii) Transfer of funds allotted for training allowances (i.e., from direct payments to trainees to other expense categories).

(d) *Programmatic changes.* Grantees or subgrantees must obtain the prior approval of the awarding agency whenever any of the following actions is anticipated:

(1) Any revision of the scope or objectives of the project (regardless of whether there is an associated budget revision requiring prior approval).

(2) Need to extend the period of availability of funds.

(3) Changes in key persons in cases where specified in an application or a grant award. In research projects, a change in the project director or principal investigator shall always require approval unless waived by the awarding agency.

(4) Under nonconstruction projects, contracting out, subgranting (if authorized by law) or otherwise obtaining the services of a third party to perform activities which are central to the purposes of the award, *unless included in the initial funding proposal*. This approval requirement is in addition to the approval requirements of 43 §12.76 but does not apply to the procurement of equipment, supplies, and general support services.

(e) *Additional prior approval requirements.* The awarding agency may not require prior approval for any budget revision which is not described in paragraph (c) of this section.

(f) *Requesting prior approval.*

(1) A request for prior approval of any budget revision will be in the same budget formal the grantee used in its application and shall be accompanied by a narrative justification for the proposed revision.

(2) A request for a prior approval under the applicable Federal cost principles (see §12.62) may be made by letter.

(3) A request by a subgrantee for prior approval will be addressed in writing to the grantee. The grantee will promptly review such request and shall approve or disapprove the request in writing. A grantee will not approve any budget or project revision which is inconsistent with the purpose or terms and conditions of the Federal grant to the grantee. If the revision, requested by the subgrantee would result in a change to the grantee's approved project which requires Federal prior approval, the grantee will obtain the Federal agency's approval before approving the subgrantee's request.

7.6 Modifications

Any changes to this Agreement shall be made by means of a written modification. Reclamation may make changes to the Agreement by means of a unilateral modification to address administrative matters, such as changes in address, no-cost time extensions, the addition of previously agreed upon funding, or deobligation of excess funds at the end of the Agreement. Additionally, a unilateral modification may be utilized by Reclamation if it should become necessary to suspend or terminate the Agreement in accordance with 43 CFR 12.83.

All other changes shall be made by means of a bilateral modification to the Agreement. No oral statement made by any person, or written statement by any person other than the GO, shall be allowed in any manner or degree to modify or otherwise effect the terms of the Agreement.

All requests for modification of the Agreement shall be made in writing, provide a full description of the reason for the request, and be sent to the attention of the GO. Any request for project extension shall be made at least 45 days prior to the expiration date of the Agreement or the expiration date of any extension period that may have been previously granted. Any determination to extend the period of performance or to provide follow-on funding for continuation of a project is solely at the discretion of Reclamation.

8. KEY PERSONNEL

8.1 Recipient's Key Personnel

The Recipient's Project Manager for this Agreement shall be:

Mr. Reggie Hill, Secretary-Manager

Changes to Key Personnel require compliance with 43 CFR 12.70(d)(3).

8.2 Reclamation's Key Personnel

8.2.1 Grants Officer (GO):

Bureau of Reclamation
Attn: Jeff Palachat
Address: 2800 Cottage Way, Sacramento, CA 95825
Telephone: (916) 978-5146

The GO is the only official with legal delegated authority to represent Reclamation. The GO's responsibilities include, but are not limited to, the following:

a) Formally obligate Reclamation to expend funds or change the funding level of the Agreement;

b) Approve through formal modification changes in the scope of work and/or budget;

c) Approve through formal modification any increase or decrease in the period of performance of the Agreement;

d) Approve through formal modification changes in any of the expressed terms, conditions, or specifications of the Agreement;

e) Be responsible for the overall administration, management, and other non-programmatic aspects of the Agreement including, but not limited to, interpretation of financial assistance statutes, regulations, circulars, policies, and terms of the Agreement;

f) Where applicable, ensures that Reclamation complies with the administrative requirements required by statutes, regulations, circulars, policies, and terms of the Agreement.

8.2.2 Grants Officer Technical Representative (GOTR):

Bureau of Reclamation
Attn: David Mooney

Address: 2800 Cottage Way, Sacramento, CA 95825
Telephone: (916) 978-5458
E-mail: dmmooney@usbr.gov

The GOTR's authority is limited to technical and programmatic aspects of the Agreement. The GOTR's responsibilities include, but are not limited to, the following:

a) Assist the Recipient, as necessary, in interpreting and carrying out the scope of work in the Agreement;

b) Review, and where required, approve Recipient reports and submittals as required by the Agreement;

c) Where applicable, monitor the Recipient to ensure compliance with the technical requirements of the Agreement;

d) Where applicable, ensure that Reclamation complies with the technical requirements of the Agreement;

The GOTR does <u>not</u> have the authority to and may <u>not</u> issue any technical assistance which:

a) Constitutes an assignment of additional work outside the scope of work of the Agreement;

b) In any manner causes an increase or decrease in the total estimated cost or the time required for performance; or

c) Changes any of the expressed terms, conditions, or specifications of the Agreement.

9. REPORTING REQUIREMENTS AND DISTRIBUTION

9.1 Noncompliance. Failure to comply with the reporting requirements contained in this Agreement may be considered a material non-compliance with the terms and conditions of the award. Non compliance may result in withholding of payments pending receipt of required reports, denying both the use of funds and matching credit for all or part of the cost of the activity or action not in compliance, whole or partial suspension or termination of the Agreement, recovery of funds paid under the Agreement, withholding of future awards, or other legal remedies in accordance with 43 CFR §12.83.

9.2 Financial Reports.   Financial Status Reports shall be submitted by means of the SF-425 and shall be submitted according to the Report Frequency and Distribution schedule below. All financial reports shall be signed by an Authorized Certifying Official for the Recipient's organization.

9.3 Monitoring and reporting program performance (43 CFR §12.80)

(a) *Monitoring by grantees.* Grantees are responsible for managing the day-to-day operations of grant and subgrant supported activities. Grantees must monitor grant and subgrant supported activities to assure compliance with applicable Federal requirements and that performance goals are being achieved. Grantee monitoring must cover each program, function or activity.

(b) *Nonconstruction performance reports.* The Federal agency may, if it decides that performance information available from subsequent applications contains sufficient information to meet its programmatic needs, require the grantee to submit a performance report only upon expiration or termination of grant support. Unless waived by the Federal agency this report will be due on the same date as the final Financial Status Report.

(1) Grantees shall submit annual performance reports unless the awarding agency requires quarterly or semi-annual reports. However, performance reports will not be required more frequently than quarterly. Annual reports shall be due 90 days after the grant year, quarterly or semi-annual reports shall be due 30 days after the reporting period. The final performance report will be due 90 days after the expiration or termination of grant support. If a justified request is submitted by a grantee, the Federal agency may extend the due date for any performance report. Additionally, requirements for unnecessary performance reports may be waived by the Federal agency.

(2) Performance reports will contain, for each grant, brief information on the following:

(i) A comparison of actual accomplishments to the objectives established for the period. Where the output of the project can be quantified, a computation of the cost per unit of output may be required if that information will be useful.

(ii) The reasons for slippage if established objectives were not met.

(iii) Additional pertinent information including, when appropriate, analysis and explanation of cost overruns or high unit costs.

(3) Grantees will not be required to submit more than the original and two copies of performance reports.

(4) Grantees will adhere to the standards in this section in prescribing performance reporting requirements for subgrantees.

(d) *Significant developments.* Events may occur between the scheduled performance reporting dates which have significant impact upon the grant or subgrant supported activity. In such cases, the grantee must inform the Federal agency as soon as the following types of conditions become known:

(1) Problems, delays, or adverse conditions which will materially impair the ability to meet the objective of the award. This disclosure must include a statement of the action taken, or contemplated, and any assistance needed to resolve the situation.

(2) Favorable developments which enable meeting time schedules and objectives sooner or at less cost than anticipated or producing more beneficial results than originally planned.

(e) Federal agencies may make site visits as warranted by program needs.

(f) *Waivers, extensions.*

(1) Federal agencies may waive any performance report required by this part if not needed.

(2) The grantee may waive any performance report from a subgrantee when not needed. The grantee may extend the due date for any performance report from a subgrantee if the grantee will still be able to meet its performance reporting obligations to the Federal agency.

9.4 Report Frequency and Distribution. The following table sets forth the reporting requirements for this Agreement.

REQUIRED REPORTS	Interim Reports	Final Report
Program Performance Report		
Format	No specific format required. See content requirements within Section 9.3 (43 CFR 12.80) above.	No specific format required. See content requirements within Section 9.3 (43 CFR 12.80) above.
Reporting Frequency	Quarterly	Final Report due upon completion of Agreement's period of performance
Reporting Period	**For Quarterly Reporting:** Federal fiscal quarters ending: December 31, March 31, June 30 September 30	Entire period of performance
Due Date	Within 30 days after the end of the Reporting Period	Within 90 days after the completion date of the Agreement
Submit to:	GO and GOTR	GO and GOTR
Financial Status Report		
Format	SF-425	SF-425
Reporting Frequency	Quarterly	Final Report due upon completion of Agreement's period of performance
Reporting Period	**For Quarterly Reporting:** Federal fiscal quarters ending: December 31, March 31, June 30 September 30	Entire period of performance
Due Date	Within 30 days after the end of the Reporting Period	Within 90 days after the completion date of the Agreement
Submit to:	GO and GOTR	GO and GOTR

10. REGULATORY COMPLIANCE

The Recipient agrees to comply with or assist Reclamation in compliance all regulatory compliance requirements and all applicable state, Federal, and local environmental and cultural and paleontological resource protection laws and regulations as applicable to this project. These may include, but are not limited to, the National Environmental Policy Act (NEPA) including the Council on Environmental Quality and Department of the Interior regulations implementing NEPA, the Clean Water Act, the Endangered Species Act, consultation with potentially affected Tribes, and consultation with the State Historic Preservation Office.

Certain environmental and other associated compliance are Federal responsibilities, and will occur as appropriate Reclamation will identify the need for, and assure the completion of, any appropriate environmental compliance requirements, as identified above, pursuant to activities specific to this assisted activity. <u>Environmental and other associated compliance shall be completed prior to the start of this project</u>. <u>As such, notwithstanding any other provision of this Agreement, Reclamation shall not provide any funds to the recipient for Agreement purposes, and the Recipient shall not begin implementation of the assisted activity described in this Agreement, unless and until Reclamation provides written notice to</u>

the recipient that all applicable environmental and regulatory compliance analyses and clearances have been completed, and the Recipient may begin implementation of the assisted activity.

II. RECLAMATION STANDARD TERMS AND CONDITIONS - STATES, LOCAL GOVERNMENTS, AND FEDERALLY RECOGNIZED INDIAN TRIBAL GOVERNMENTS

1. REGULATIONS

The regulations at 43 CFR, Part 12, Subparts A, C, E, and F, are hereby incorporated by reference as though set forth in full text. The following Office of Management and Budget (OMB) Circulars, as applicable, and as implemented by 43 CFR Part 12, are also incorporated by reference and made a part of this Agreement. Failure of a Recipient to comply with any applicable regulation or circular may be the basis for withholding payments for proper charges made by the Recipient and/or for termination of support.

1.1 Colleges and Universities that are Recipients or sub-recipients shall use the following:

2 CFR Parts 215 and 220 (Circular A 21), "Cost Principles for Educational Institutions"

Circular A 110, as amended September 30, 1999, "Uniform Administrative Requirements for Grants and Agreements with Institutions of Higher Education, Hospitals, and Other Non-Profit Organizations" (Codification by Department of Interior, 43 CFR 12, Subpart F)

Circular A-133, revised June 27, 2003, "Audits of States, Local Governments, and Non-Profit Organizations"

1.2 State, Local and Tribal Governments that are Recipients or sub-recipients shall use the following:

2 CFR Part 225 (Circular A 87), "Cost Principles for State, Local, and Indian Tribal Governments"

Circular A 102, as amended August 29, 1997, "Grants and Cooperative Agreements with State and Local Governments" (Grants Management Common Rule, Codification by Department of Interior, 43 CFR 12, Subpart C)

Circular A-133, revised June 27, 2003, Audits of States, Local Governments, and Non-Profit Organizations"

1.3 Nonprofit Organizations that are Recipients or sub-recipients shall use the following:

2 CFR Part 230 (Circular A 122), “Cost Principles for Non-Profit Organizations"

Circular A 110, as amended September 30, 1999, "Uniform Administrative Requirements for Grants and Agreements With Institutions of Higher Education, Hospitals, and Other Non-Profit Organizations" (Codification by Department of Interior, 43 CFR 12, Subpart F)

Circular A-133, revised June 27, 2003, “Audits of States, Local Governments, and Non-Profit Organizations”

1.4 Organizations other than those indicated above that are Recipients or sub-recipients shall use the basic principles of OMB Circular A-110 (Codification by Department of Interior, 43 CFR 12, Subpart F), and cost principles shall be in accordance with 48 CFR Subpart 31.2.

1.5 43 CFR 12.77 sets forth further regulations that govern the award and administration of subawards by State governments.

2. PAYMENT

2.1 Payment Standards. (43 CFR §12.61)

(a) *Scope.* This section prescribes the basic standard and the methods under which a Federal agency will make payments to grantees, and grantees will make payments to subgrantees and contractors.

(b) *Basic standard.* Methods and procedures for payment shall minimize the time elapsing between the transfer of funds and disbursement by the grantee or subgrantee, in accordance with Treasury regulations at 31 CFR part 205.

(c) *Advances.* Grantees and subgrantees shall be paid in advance, provided they maintain or demonstrate the willingness and ability to maintain procedures to minimize the time elapsing between the transfer of the funds and their disbursement by the grantee or subgrantee.

(d) *Reimbursement.* Reimbursement shall be the preferred method when the requirements in paragraph (c) of this section are not met. Grantees and subgrantees may also be paid by reimbursement for any construction grant. Except as otherwise specified in regulation, Federal agencies shall not use the percentage of completion method to pay construction grants. The grantee or subgrantee may use that method to pay its construction contractor, and if it does, the awarding agency's payments to the grantee or subgrantee will be based on the grantee's or subgrantee's actual rate of disbursement.

(e) *Working capital advances.* If a grantee cannot meet the criteria for advance payments described in paragraph (c) of this section, and the Federal agency has determined that reimbursement is not feasible because the grantee lacks sufficient working capital, the awarding agency may provide cash or a working capital advance basis. Under this procedure the awarding agency shall advance cash to the grantee to cover its estimated disbursement needs for an initial period generally geared to the grantee's disbursing cycle. Thereafter, the awarding agency shall reimburse the grantee for its actual cash disbursements. The working capital advance method of payment shall not be used by grantees or subgrantees if the reason for using such method is the unwillingness or inability of the grantee to provide timely advances to the subgrantee to meet the subgrantee's actual cash disbursements.

(f) *Effect of program income, refunds, and audit recoveries on payment.*

(1) Grantees and subgrantees shall disburse repayments to and interest earned on a revolving fund before requesting additional cash payments for the same activity.
(2) Except as provided in paragraph (f)(1) of this section, grantees and subgrantees shall disburse program income, rebates, refunds, contract settlements, audit recoveries and interest earned on such funds before requesting additional cash payments.

(g) *Withholding payments.*

(1) Unless otherwise required by Federal statute, awarding agencies shall not withhold payments for proper charges incurred by grantees or subgrantees unless—

(i) The grantee or subgrantee has failed to comply with grant award conditions, or

(ii) The grantee or subgrantee is indebted to the United States.

(2) Cash withheld for failure to comply with grant award condition, but without suspension of the grant, shall be released to the grantee upon subsequent compliance. When a grant is suspended, payment adjustments will be made in accordance with §12.83(c).

(3) A Federal agency shall not make payment to grantees for amounts that are withheld by grantees or subgrantees from payment to contractors to assure satisfactory completion of work. Payments shall be made by the Federal agency when the grantees or subgrantees actually disburse the withheld funds to the contractors or to escrow accounts established to assure satisfactory completion of work.

(h) *Cash depositories.*

(1) Consistent with the national goal of expanding the opportunities for minority business enterprises, grantees and subgrantees are encouraged to use minority banks (a bank which is owned at least 50 percent by minority group members). A list of minority owned banks can be obtained from the Minority Business Development Agency, Department of Commerce, Washington, DC 20230.

(2) A grantee or subgrantee shall maintain a separate bank account only when required by Federal-State Agreement.

(i) *Interest earned on advances.* Except for interest earned on advances of funds exempt under the Intergovernmental Cooperation Act (31 U.S.C. 6501 et seq.) and the Indian Self-Determination Act (23 U.S.C. 450), grantees and subgrantees shall promptly, but at least quarterly, remit interest earned on advances to the Federal agency. The grantee or subgrantee may keep interest amounts up to $100 per year for administrative expenses.

2.2 Payment Method

Requesting Payments -- Requests for advance or reimbursement may be made by the following methods:

(1) SF-270, Request for Advance or Reimbursement - Recipients may submit an original and properly certified SF-270 form to the GO. For advance payments, this form may be submitted on a monthly basis, at least two weeks prior to the date on which funds are required, and on the basis of expected disbursements for the succeeding month and the amount of Federal funds already on hand. Requests for reimbursement may be submitted on a monthly basis, or more frequently if authorized by the (GO).

(2) Automated Standard Application for Payments (ASAP) - Recipients may utilize the Department of Treasury ASAP payment system to request advances or reimbursements. ASAP is a Recipient-initiated payment and information system designed to provide a single point of contact for the request and delivery of Federal funds.

Recipients interested in enrolling in the ASAP system, please contact Dee Devillier at 303-445-3461 or Sheri Oren at 303-445-3448.

3. PROCUREMENT STANDARDS (43 CFR §12.76)

(a) *States.* When procuring property and services under a grant, a State will follow the same policies and procedures it uses for procurements from its non-Federal funds. The State will ensure that every purchase order or other contract includes any clauses required by Federal statutes and executive orders and their implementing regulations. Other grantees and subgrantees will follow paragraphs (b) through (i) in this section.

(b) *Procurement standards.*

(1) Grantees and subgrantees will use their own procurement procedures which reflect applicable State and local laws and regulations, provided that the procurements conform to applicable Federal law and the standards identified in this section.

(2) Grantees and subgrantees will maintain a contract administration system which ensures that contractors perform in accordance with the terms, conditions, and specifications of their contracts or purchase orders.

(3) Grantees and subgrantees will maintain a written code of standards of conduct governing the performance of their employees engaged in the award and administration of contracts. No employee, officer or agent of the grantee or subgrantee shall participate in selection, or in the award or administration of a contract supported by Federal funds if a conflict of interest, real or apparent, would be involved. Such a conflict would arise when:

(i) The employee, officer or agent,

(ii) Any member of his immediate family,

(iii) His or her partner, or

(iv) An organization which employs, or is about to employ, any of the above, has a financial or other interest in the firm selected for award. The grantee's or subgrantee's officers, employees or agents will neither solicit nor accept gratuities, favors or anything of monetary value from contractors, potential contractors, or parties to subagreements. Grantee and subgrantees may set minimum rules where the financial interest is not substantial or the gift is an unsolicited item of nominal intrinsic value. To the extent permitted by State or local law or regulations, such standards or conduct will provide for penalties, sanctions, or other disciplinary actions for violations of such standards by the grantee's and subgrantee's officers, employees, or agents, or by contractors or their agents. The awarding agency may in regulation provide additional prohibitions relative to real, apparent, or potential conflicts of interest.

(4) Grantee and subgrantee procedures will provide for a review of proposed procurements to avoid purchase of unnecessary or duplicative items. Consideration should be given to consolidating or breaking out procurements to obtain a more economical purchase. Where appropriate, an analysis will be made of lease versus purchase alternatives, and any other appropriate analysis to determine the most economical approach.

(5) To foster greater economy and efficiency, grantees and subgrantees are encouraged to enter into State and local intergovernmental agreements for procurement or use of common goods and services.

(6) Grantees and subgrantees are encouraged to use Federal excess and surplus property in lieu of purchasing new equipment and property whenever such use is feasible and reduces project costs.

(7) Grantees and subgrantees are encouraged to use value engineering clauses in contracts for construction projects of sufficient size to offer reasonable opportunities for cost reductions. Value engineering is a systematic and creative analysis of each contract item or task to ensure that its essential function is provided at the overall lower cost.

(8) Grantees and subgrantees will make awards only to responsible contractors possessing the ability to perform successfully under the terms and conditions of a proposed procurement. Consideration will be given to such matters as contractor integrity, compliance with public policy, record of past performance, and financial and technical resources.

(9) Grantees and subgrantees will maintain records sufficient to detail the significant history of a procurement. These records will include, but are not necessarily limited to the following: rationale for the method of procurement, selection of contract type, contractor selection or rejection, and the basis for the contract price.

(10) Grantees and subgrantees will use time and material type contracts only—

(i) After a determination that no other contract is suitable, and

(ii) If the contract includes a ceiling price that the contractor exceeds at its own risk.

(11) Grantees and subgrantees alone will be responsible, in accordance with good administrative practice and sound business judgment, for the settlement of all contractual and administrative issues arising out of procurements. These issues include, but are not limited to source evaluation, protests, disputes, and claims. These standards do not relieve the grantee or subgrantee of any contractual responsibilities under its contracts. Federal agencies will not substitute their judgment for that of the grantee or subgrantee unless the matter is primarily a Federal concern. Violations of law will be referred to the local, State, or Federal authority having proper jurisdiction.

(12) Grantees and subgrantees will have protest procedures to handle and resolve disputes relating to their procurements and shall in all instances disclose information regarding the protest to the awarding agency. A protestor must exhaust all administrative remedies with the grantee and subgrantee before pursuing a protest with the Federal agency. Reviews of protests by the Federal agency will be limited to:

(i) Violations of Federal law or regulations and the standards of this section (violations of State or local law will be under the jurisdiction of State or local authorities) and

(ii) Violations of the grantee's or subgrantee's protest procedures for failure to review a complaint or protest. Protests received by the Federal agency other than those specified above will be referred to the grantee or subgrantee.

(c) *Competition.*

(1) All procurement transactions will be conducted in a manner providing full and open competition consistent with the standards of §12.76. Some of the situations considered to be restrictive of competition include but are not limited to:

(i) Placing unreasonable requirements on firms in order for them to qualify to do business,

(ii) Requiring unnecessary experience and excessive bonding,

(iii) Noncompetitive pricing practices between firms or between affiliated companies,

(iv) Noncompetitive awards to consultants that are on retainer contracts,

(v) Organizational conflicts of interest,

(vi) Specifying only a “brand name” product instead of allowing “an equal” product to be offered and describing the performance of other relevant requirements of the procurement, and

(vii) Any arbitrary action in the procurement process.

(2) Grantees and subgrantees will conduct procurements in a manner that prohibits the use of statutorily or administratively imposed in-State or local geographical preferences in the evaluation of bids or proposals, except in those cases where applicable Federal statutes expressly mandate or encourage geographic preference. Nothing in this section preempts State licensing laws. When contracting for architectural and engineering (A/E) services, geographic location may be a selection criteria provided its application leaves an appropriate number of qualified firms, given the nature and size of the project, to compete for the contract.

(3) Grantees will have written selection procedures for procurement transactions. These procedures will ensure that all solicitations:

(i) Incorporate a clear and accurate description of the technical requirements for the material, product, or service to be procured. Such description shall not, in competitive procurements, contain features which unduly restrict competition. The description may include a statement of the qualitative nature of the material, product or service to be procured, and when necessary, shall set forth those minimum essential characteristics and standards to which it must conform if it is to satisfy its intended use. Detailed product specifications should be avoided if at all possible. When it is impractical or uneconomical to make a clear and accurate description of the technical requirements, a “brand name or equal” description may be used as a means to define the performance or other salient requirements of a procurement. The specific features of the named brand which must be met by offerors shall be clearly stated; and

(ii) Identify all requirements which the offerors must fulfill and all other factors to be used in evaluating bids or proposals.

(4) Grantees and subgrantees will ensure that all prequalified lists of persons, firms, or products which are used in acquiring goods and services are current and include enough qualified sources to ensure maximum open and free competition. Also, grantees and subgrantees will not preclude potential bidders from qualifying during the solicitation period.

(d) *Methods of procurement to be followed* —(1) *Procurement by small purchase procedures.* Small purchase procedures are those relatively simple and informal procurement methods for securing services, supplies, or other property that do not cost more than the simplified acquisition threshold fixed at 41 U.S.C. 403(11) (currently set at $100,000). If small purchase procedures are used, price or rate quotations shall be obtained from an adequate number of qualified sources.

(2) Procurement by *sealed bids* (formal advertising). Bids are publicly solicited and a firm-fixed-price contract (lump sum or unit price) is awarded to the responsible bidder whose bid, conforming with all the material terms and conditions of the invitation for bids, is the lowest in price. The sealed bid method is the preferred method for procuring construction, if the conditions in §12.76(d)(2)(i) apply.

(i) In order for sealed bidding to be feasible, the following conditions should be present:

(A) A complete, adequate, and realistic specification or purchase description is available;

(B) Two or more responsible bidders are willing and able to compete effectively and for the business; and

(C) The procurement lends itself to a firm fixed price contract and the selection of the successful bidder can be made principally on the basis of price.

(ii) If sealed bids are used, the following requirements apply:

(A) The invitation for bids will be publicly advertised and bids shall be solicited from an adequate number of known suppliers, providing them sufficient time prior to the date set for opening the bids;

(B) The invitation for bids, which will include any specifications and pertinent attachments, shall define the items or services in order for the bidder to properly respond;

(C) All bids will be publicly opened at the time and place prescribed in the invitation for bids;

(D) A firm fixed-price contract award will be made in writing to the lowest responsive and responsible bidder. Where specified in bidding documents, factors such as discounts, transportation cost, and life cycle costs shall be considered in determining which bid is lowest. Payment discounts will only be used to determine the low bid when prior experience indicates that such discounts are usually taken advantage of; and

(E) Any or all bids may be rejected if there is a sound documented reason.

(3) Procurement by *competitive proposals.* The technique of competitive proposals is normally conducted with more than one source submitting an offer, and either a fixed-price or cost-reimbursement type contract is awarded. It is generally used when conditions are not appropriate for the use of sealed bids. If this method is used, the following requirements apply:

(i) Requests for proposals will be publicized and identify all evaluation factors and their relative importance. Any response to publicized requests for proposals shall be honored to the maximum extent practical;

(ii) Proposals will be solicited from an adequate number of qualified sources;

(iii) Grantees and subgrantees will have a method for conducting technical evaluations of the proposals received and for selecting awardees;

(iv) Awards will be made to the responsible firm whose proposal is most advantageous to the program, with price and other factors considered; and

(v) Grantees and subgrantees may use competitive proposal procedures for qualifications-based procurement of architectural/engineering (A/E) professional services whereby competitors' qualifications are evaluated and the most qualified competitor is selected, subject to negotiation of fair and reasonable compensation. The method, where price is not used as a selection factor, can only be used in procurement of A/E professional services. It cannot be used to purchase other types of services though A/E firms are a potential source to perform the proposed effort.

(4) Procurement by *noncompetitive proposals* is procurement through solicitation of a proposal from only one source, or after solicitation of a number of sources, competition is determined inadequate.

(i) Procurement by noncompetitive proposals may be used only when the award of a contract is infeasible under small purchase procedures, sealed bids or competitive proposals and one of the following circumstances applies:

(A) The item is available only from a single source;

(B) The public exigency or emergency for the requirement will not permit a delay resulting from competitive solicitation;

(C) The awarding agency authorizes noncompetitive proposals; or

(D) After solicitation of a number of sources, competition is determined inadequate.

(ii) Cost analysis, i.e., verifying the proposed cost data, the projections of the data, and the evaluation of the specific elements of costs and profits, is required.

(iii) Grantees and subgrantees may be required to submit the proposed procurement to the awarding agency for pre-award review in accordance with paragraph (g) of this section.

(e) *Contracting with small and minority firms, women's business enterprise and labor surplus area firms.* (1) The grantee and subgrantee will take all necessary affirmative steps to assure that minority firms, women's business enterprises, and labor surplus area firms are used when possible.

(2) Affirmative steps shall include:

(i) Placing qualified small and minority businesses and women's business enterprises on solicitation lists;

(ii) Assuring that small and minority businesses, and women's business enterprises are solicited whenever they are potential sources;

(iii) Dividing total requirements, when economically feasible, into smaller tasks or quantities to permit maximum participation by small and minority business, and women's business enterprises;

(iv) Establishing delivery schedules, where the requirement permits, which encourage participation by small and minority business, and women's business enterprises;

(v) Using the services and assistance of the Small Business Administration, and the Minority Business Development Agency of the Department of Commerce; and

(vi) Requiring the prime contractor, if subcontracts are to be let, to take the affirmative steps listed in paragraphs (e)(2) (i) through (v) of this section.

(f) *Contract cost and price.*

(1) Grantees and subgrantees must perform a cost or price analysis in connection with every procurement action including contract modifications. The method and degree of analysis is dependent on the facts surrounding the particular procurement situation, but as a starting point, grantees must make independent estimates before receiving bids or proposals. A cost analysis must be performed when the offeror is required to submit the elements of his estimated cost, e.g., under professional, consulting, and architectural engineering services contracts. A cost analysis will be necessary when adequate price competition is lacking, and for sole source procurements, including contract modifications or change orders, unless price reasonableness can be established on the basis of a catalog or market price of a commercial product sold in substantial quantities to the general public or based on prices set by law or regulation. A price analysis will be used in all other instances to determine the reasonableness of the proposed contract price.

(2) Grantees and subgrantees will negotiate profit as a separate element of the price for each contract in which there is no price competition and in all cases where cost analysis is performed. To establish a fair and reasonable profit, consideration will be given to the complexity of the work to be performed, the risk borne by the contractor, the contractor's investment, the amount of subcontracting, the quality of its record of past performance, and industry profit rates in the surrounding geographical area for similar work.

(3) Costs or prices based on estimated costs for contracts under grants will be allowable only to the extent that costs incurred or cost estimates included in negotiated prices are consistent with Federal cost principles (see §12.62). Grantees may reference their own cost principles that comply with the applicable Federal cost principles.

(4) The cost plus a percentage of cost and percentage of construction cost methods of contracting shall not be used.

(g) *Awarding agency review.*

(1) Grantees and subgrantees must make available, upon request of the awarding agency, technical specifications on proposed procurements where the awarding agency believes such review is needed to ensure that the item and/or service specified is the one being proposed for purchase. This review generally will take place prior to the time the specification is incorporated into a solicitation document. However, if the grantee or subgrantee desires to have the review accomplished after a solicitation has been developed, the awarding agency may still review the specifications, with such review usually limited to the technical aspects of the proposed purchase.

(2) Grantees and subgrantees must on request make available for awarding agency pre-award review procurement documents, such as requests for proposals or invitations for bids, independent cost estimates, etc. when:

(i) A grantee's or subgrantee's procurement procedures or operation fails to comply with the procurement standards in this section; or

(ii) The procurement is expected to exceed the simplified acquisition threshold and is to be awarded without competition or only one bid or offer is received in response to a solicitation; or

(iii) The procurement, which is expected to exceed the simplified acquisition threshold, specifies a “brand name” product; or

(iv) The proposed award is more than the simplified acquisition threshold and is to be awarded to other than the apparent low bidder under a sealed bid procurement; or

(v) A proposed contract modification changes the scope of a contract or increases the contract amount by more than the simplified acquisition threshold.

(3) A grantee or subgrantee will be exempt from the pre-award review in paragraph (g)(2) of this section if the awarding agency determines that its procurement systems comply with the standards of this section.

(i) A grantee or subgrantee may request that its procurement system be reviewed by the awarding agency to determine whether its system meets these standards in order for its system to be certified. Generally, these reviews shall occur where there is a continuous high-dollar funding, and third-party contracts are awarded on a regular basis.

(ii) A grantee or subgrantee may self-certify its procurement system. Such self-certification shall not limit the awarding agency's right to survey the system. Under a self-certification procedure, awarding agencies may wish to rely on written assurances from the grantee or subgrantee that it is complying with these standards. A grantee or subgrantee will cite specific procedures, regulations, standards, etc., as being in compliance with these requirements and have its system available for review.

(h) *Bonding requirements.* For construction or facility improvement contracts or subcontracts exceeding the simplified acquisition threshold, the awarding agency may accept the bonding policy and requirements of the grantee or subgrantee provided the awarding agency has made a determination that the awarding agency's interest is adequately protected. If such a determination has not been made, the minimum requirements shall be as follows:

(1) *A bid guarantee from each bidder equivalent to five percent of the bid price.* The “bid guarantee” shall consist of a firm commitment such as a bid bond, certified check, or other negotiable instrument accompanying a bid as assurance that the bidder will, upon acceptance of his bid, execute such contractual documents as may be required within the time specified.

(2) *A performance bond on the part of the contractor for 100 percent of the contract price.* A “performance bond” is one executed in connection with a contract to secure fulfillment of all the contractor's obligations under such contract.

(3) *A payment bond on the part of the contractor for 100 percent of the contract price.* A “payment bond” is one executed in connection with a contract to assure payment as required by law of all persons supplying labor and material in the execution of the work provided for in the contract.

(i) *Contract provisions.* A grantee's and subgrantee's contracts must contain provisions in paragraph (i) of this section. Federal agencies are permitted to require changes, remedies, changed conditions, access and records retention, suspension of work, and other clauses approved by the Office of Federal Procurement Policy.

(1) Administrative, contractual, or legal remedies in instances where contractors violate or breach contract terms, and provide for such sanctions and penalties as may be appropriate. (Contracts more than the simplified acquisition threshold)

(2) Termination for cause and for convenience by the grantee or subgrantee including the manner by which it will be effected and the basis for settlement. (All contracts in excess of $10,000)

(3) Compliance with Executive Order 11246 of September 24, 1965, entitled “Equal Employment Opportunity,” as amended by Executive Order 11375 of October 13, 1967, and as supplemented in Department of Labor regulations (41 CFR chapter 60). (All construction contracts awarded in excess of $10,000 by grantees and their contractors or subgrantees)

(4) Compliance with the Copeland “Anti-Kickback” Act (18 U.S.C. 874) as supplemented in Department of Labor regulations (29 CFR Part 3). (All contracts and subgrants for construction or repair)

(5) Compliance with the Davis-Bacon Act (40 U.S.C. 276a to 276a–7) as supplemented by Department of Labor regulations (29 CFR Part 5). (Construction contracts in excess of $2000 awarded by grantees and subgrantees when required by Federal grant program legislation)

(6) Compliance with Sections 103 and 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 327–330) as supplemented by Department of Labor regulations (29 CFR Part 5). (Construction contracts awarded by grantees and subgrantees in excess of $2000, and in excess of $2500 for other contracts which involve the employment of mechanics or laborers)

(7) Notice of awarding agency requirements and regulations pertaining to reporting.

(8) Notice of awarding agency requirements and regulations pertaining to patent rights with respect to any discovery or invention which arises or is developed in the course of or under such contract.

(9) Awarding agency requirements and regulations pertaining to copyrights and rights in data.

(10) Access by the grantee, the subgrantee, the Federal grantor agency, the Comptroller General of the United States, or any of their duly authorized representatives to any books, documents, papers, and records of the contractor which are directly pertinent to that specific contract for the purpose of making audit, examination, excerpts, and transcriptions.

(11) Retention of all required records for three years after grantees or subgrantees make final payments and all other pending matters are closed.

(12) Compliance with all applicable standards, orders, or requirements issued under section 306 of the Clean Air Act (42 U.S.C. 1857(h)), section 508 of the Clean Water Act (33 U.S.C. 1368), Executive Order 11738, and Environmental Protection Agency regulations (40 CFR part 15). (Contracts, subcontracts, and subgrants of amounts in excess of $100,000)

(13) Mandatory standards and policies relating to energy efficiency which are contained in the State energy conservation plan issued in compliance with the Energy Policy and Conservation Act (Pub. L. 94–163, 89 Stat. 871).

4. EQUIPMENT (43 CFR §12.72)

(a) *Title.* Subject to the obligations and conditions set forth in this section, title to equipment acquired under a grant or subgrant will vest upon acquisition in the grantee or subgrantee respectively.

(b) *States.* A State will use, manage, and dispose of equipment acquired under a grant by the State in accordance with State laws and procedures. Other grantees and subgrantees will follow paragraphs (c) through (e) of this section.

(c) *Use.*

(1) Equipment shall be used by the grantee or subgrantee in the program or project for which it was acquired as long as needed, whether or not the project or program continues to be supported by Federal funds. When no longer needed for the original program or project, the equipment may be used in other activities currently or previously supported by a Federal agency.

(2) The grantee or subgrantee shall also make equipment available for use on other projects or programs currently or previously supported by the Federal Government, providing such use will not interfere with the work on the projects or program for which it was originally acquired. First preference for other use shall be given to other programs or projects supported by the awarding agency. User fees should be considered if appropriate.

(3) Notwithstanding the encouragement in §12.65(a) to earn program income, the grantee or subgrantee must not use equipment acquired with grant funds to provide services for a fee to compete unfairly with private companies that provide equivalent services, unless specifically permitted or contemplated by Federal statute.

(4) When acquiring replacement equipment, the grantee or subgrantee may use the equipment to be replaced as a trade-in or sell the property and use the proceeds to offset the cost of the replacement property, subject to the approval of the awarding agency.

(d) *Management requirements.* Procedures for managing equipment (including replacement equipment), whether acquired in whole or in part with grant funds, until disposition takes place will, as a minimum, meet the following requirements:

(1) Property records must be maintained that include a description of the property, a serial number or other identification number, the source of property, who holds title, the acquisition date, and cost of the property, percentage of Federal participation in the cost of the property, the location, use and condition of the property, and any ultimate disposition data including the date of disposal and sale price of the property.

(2) A physical inventory of the property must be taken and the results reconciled with the property records at least once every two years.

(3) A control system must be developed to ensure adequate safeguards to prevent loss, damage, or theft of the property. Any loss, damage, or theft shall be investigated.

(4) Adequate maintenance procedures must be developed to keep the property in good condition.

(5) If the grantee or subgrantee is authorized or required to sell the property, proper sales procedures must be established to ensure the highest possible return.

(e) *Disposition.* When original or replacement equipment acquired under a grant or subgrant is no longer needed for the original project or program or for other activities currently or previously supported by a Federal agency, disposition of the equipment will be made as follows:

(1) Items of equipment with a current per-unit fair market value of less than $5,000 may be retained, sold or otherwise disposed of with no further obligation to the awarding agency.

(2) Items of equipment with a current per unit fair market value in excess of $5,000 may be retained or sold and the awarding agency shall have a right to an amount calculated by multiplying the current market value or proceeds from sale by the awarding agency's share of the equipment.

(3) In cases where a grantee or subgrantee fails to take appropriate disposition actions, the awarding agency may direct the grantee or subgrantee to take excess and disposition actions.

(f) *Federal equipment.* In the event a grantee or subgrantee is provided Federally-owned equipment:

(1) Title will remain vested in the Federal Government.

(2) Grantees or subgrantees will manage the equipment in accordance with Federal agency rules and procedures, and submit an annual inventory listing.

(3) When the equipment is no longer needed, the grantee or subgrantee will request disposition instructions from the Federal agency.

(g) *Right to transfer title.* The Federal awarding agency may reserve the right to transfer title to the Federal Government or a third part named by the awarding agency when such a third party is otherwise eligible under existing statutes. Such transfers shall be subject to the following standards:

(1) The property shall be identified in the grant or otherwise made known to the grantee in writing.

(2) The Federal awarding agency shall issue disposition instruction within 120 calendar days after the end of the Federal support of the project for which it was acquired. If the Federal awarding agency fails to issue disposition instructions within the 120 calendar-day period the grantee shall follow 12.72(e).

(3) When title to equipment is transferred, the grantee shall be paid an amount calculated by applying the percentage of participation in the purchase to the current fair market value of the property.

5. SUPPLIES (43 CFR §12.73)

(a) *Title.* Title to supplies acquired under a grant or subgrant will vest, upon acquisition, in the grantee or subgrantee respectively.

(b) *Disposition.* If there is a residual inventory of unused supplies exceeding $5,000 in total aggregate fair market value upon termination or completion of the award, and if the supplies are not needed for any other Federally sponsored programs or projects, the grantee or subgrantee shall compensate the awarding agency for its share.

6. INSPECTION

Reclamation has the right to inspect and evaluate the work performed or being performed under this Agreement, and the premises where the work is being performed, at all reasonable times and in a manner that will not unduly delay the work. If Reclamation performs inspection or evaluation on the premises of the Recipient or a sub-Recipient, the Recipient shall furnish and shall require sub-recipients to furnish all reasonable facilities and assistance for the safe and convenient performance of these duties.

7. AUDIT (31 U.S.C. 7501-7507)

Non-Federal entities that expend $500,000 or more in a year in Federal awards shall have a single or program-specific audit conducted for that year in accordance with the Single Audit Act Amendments of 1996 (31 U.S.C. 7501-7507) and revised OMB Circular A-133. Federal awards are defined as Federal financial assistance and Federal cost-reimbursement contracts that non-Federal entities receive directly from Federal awarding agencies or indirectly from pass-through entities. They do not include procurement contracts, under grants or contracts, used to buy goods or services from vendors. Non-Federal entities that expend less than $500,000 a year in Federal awards are exempt from Federal audit requirements for that year, except as noted in A-133, §___.215(a), but records must be available for review or audit by appropriate officials of the Federal agency, pass-through entity, and General Accounting Office (GAO).

8. ENFORCEMENT (43 CFR §12.83)

(a) *Remedies for noncompliance.* If a grantee or subgrantee materially fails to comply with any term of an award, whether stated in a Federal statute or regulation, an assurance, in a State plan or application, a notice of award, or elsewhere, the awarding agency may take one or more of the following actions, as appropriate in the circumstances:

(1) Temporarily withhold cash payments pending correction of the deficiency by the grantee or subgrantee or more severe enforcement action by the awarding agency,

(2) Disallow (that is, deny both use of funds and matching credit for) all or part of the cost of the activity or action not in compliance,

(3) Wholly or partly suspend or terminate the current award for the grantee's or subgrantee's program,

(4) Withhold further awards for the program, or

(5) Take other remedies that may be legally available.

(b) *Hearings, appeals.* In taking an enforcement action, the awarding agency will provide the grantee or subgrantee an opportunity for such hearing, appeal, or other administrative proceeding to which the grantee or subgrantee is entitled under any statute or regulation applicable to the action involved.

(c) *Effects of suspension and termination.* Costs of grantee or subgrantee resulting from obligations incurred by the grantee or subgrantee during a suspension or after termination of an award are not allowable unless the awarding agency expressly authorizes them in the notice of suspension or termination or subsequently. Other grantee or subgrantee costs during suspension or after termination which are necessary and not reasonably avoidable are allowable if:

(1) The costs result from obligations which were properly incurred by the grantee or subgrantee before the effective date of suspension or termination, are not in anticipation of it, and, in the case of a termination, are noncancellable, and,

(2) The costs would be allowable if the award were not suspended or expired normally at the end of the funding period in which the termination takes effect.

(d) *Relationship to Debarment and Suspension.* The enforcement remedies identified in this section, including suspension and termination, do not preclude grantee or subgrantee from being subject to "Debarment and Suspension" under E.O. 12549 ((2 CFR 29.5.12 and 2 CFR 1400, Subpart C).

9. TERMINATION FOR CONVENIENCE (43 CFR §12.84)

Except as provided in 43 CFR §12.83 awards may be terminated in whole or in part only as follows:

(a) By the awarding agency with the consent of the grantee or subgrantee in which case the two parties shall agree upon the termination conditions, including the effective date and in the case of partial termination, the portion to be terminated, or

(b) By the grantee or subgrantee upon written notification to the awarding agency, setting forth the reasons for such termination, the effective date, and in the case of partial termination, the portion to be terminated. However, if, in the case of a partial termination, the awarding agency determines that the remaining portion of the award will not accomplish the purposes for which the award was made, the awarding agency may terminate the award in its entirety under either §12.83 or paragraph (a) of this section.

10. DEBARMENT AND SUSPENSION (2 CFR §1400)

The Department of the Interior regulations at 2 CFR 1400—Governmentwide Debarment and Suspension (Nonprocurement), which adopt the common rule for the governmentwide system of debarment and suspension for nonprocurement activities, are hereby incorporated by reference and made a part of this Agreement. By entering into this grant or cooperative Agreement with the Bureau of Reclamation, the Recipient agrees to comply with 2 CFR 1400, Subpart C, and agrees to include a similar term or condition in all lower-tier covered transactions. These regulations are available at http://www.gpoaccess.gov/ecfr/ .

11. DRUG-FREE WORKPLACE (43 CFR §43)

The Department of the Interior regulations at 43 CFR 43—Governmentwide Requirements for Drug-Free Workplace (Financial Assistance), which adopt the portion of the Drug-Free Workplace Act of 1988 (41 U.S.C. 701 et seq, as amended) applicable to grants and cooperative Agreements, are hereby incorporated by reference and made a part of this Agreement. By entering into this grant or cooperative Agreement with the Bureau of Reclamation, the Recipient agrees to comply with 43 CFR 43, Subpart B, if the

Recipient is not an individual, or with 43 CFR 43, Subpart C, if the Recipient is an individual. These regulations are available at http://www.gpoaccess.gov/ecfr/ .

12. ASSURANCES AND CERTIFICATIONS INCORPORATED BY REFERENCE

The provisions of the Assurances, SF 424B or SF 424D as applicable, executed by the Recipient in connection with this Agreement shall apply with full force and effect to this Agreement. All anti-discrimination and equal opportunity statutes, regulations, and Executive Orders that apply to the expenditure of funds under Federal contracts, grants, and cooperative Agreements, loans, and other forms of Federal assistance. The Recipient shall comply with Title VI or the Civil Rights Act of 1964, Title IX of the Education Amendments of 1972, Section 504 of the Rehabilitation Act of 1973, the Age Discrimination Act of 1975, and nay program-specific statutes with anti-discrimination requirements. The Recipient shall comply with civil rights laws including, but not limited to, the Fair Housing Act, the Fair Credit Reporting Act, the Americans with Disabilities Act, Title VII of the Civil Rights Act of 1964, the Equal Educational Opportunities Act, the Age Discrimination in Employment Act, and the Uniform Relocation Act.

Such Assurances also include, but are not limited to, the promise to comply with all applicable Federal statutes and orders relating to nondiscrimination in employment, assistance, and housing; the Hatch Act; Federal wage and hour laws and regulations and work place safety standards; Federal environmental laws and regulations and the Endangered Species Act; and Federal protection of rivers and waterways and historic and archeological preservation.

13. COVENANT AGAINST CONTINGENT FEES

The Recipient warrants that no person or agency has been employed or retained to solicit or secure this Agreement upon an Agreement or understanding for a commission, percentage, brokerage, or contingent fee, excepting bona fide employees or bona fide offices established and maintained by the Recipient for the purpose of securing Agreements or business. For breach or violation of this warranty, the Government shall have the right to annul this Agreement without liability or, in its discretion, to deduct from the Agreement amount, or otherwise recover, the full amount of such commission, percentage, brokerage, or contingent fee

14. TRAFFICKING VICTIMS PROTECION ACT OF 2000 (2 CFR §175.15)

(a) To implement the trafficking in persons requirement in section 106(g) of the TVPA, as amended, a Federal awarding agency must include the award term in paragraph (b) of this section in—

(1) A grant or cooperative agreement to a private entity, as defined in §175.25(d); and

(2) A grant or cooperative agreement to a State, local government, Indian tribe or foreign public entity, if funding could be provided under the award to a private entity as a subrecipient.

(b) The award term that an agency must include, as described in paragraph (a) of this section, is:

I. Trafficking in persons.

a. *Provisions applicable to a recipient that is a private entity* .

1. You as the recipient, your employees, subrecipients under this award, and subrecipients' employees may not—

i. Engage in severe forms of trafficking in persons during the period of time that the award is in effect;

ii. Procure a commercial sex act during the period of time that the award is in effect; or

iii. Use forced labor in the performance of the award or subawards under the award.

2. We as the Federal awarding agency may unilaterally terminate this award, without penalty, if you or a subrecipient that is a private entity —

i. Is determined to have violated a prohibition in paragraph a.1 of this award term; or

ii. Has an employee who is determined by the agency official authorized to terminate the award to have violated a prohibition in paragraph a.1 of this award term through conduct that is either—

A. Associated with performance under this award; or

B. Imputed to you or the subrecipient using the standards and due process for imputing the conduct of an individual to an organization that are provided in 2 CFR part 180, "OMB Guidelines to Agencies on Governmentwide Debarment and Suspension (Nonprocurement)," as implemented by our agency at *2 CFR part 1400*.

b. *Provision applicable to a recipient other than a private entity* . We as the Federal awarding agency may unilaterally terminate this award, without penalty, if a subrecipient that is a private entity—

1. Is determined to have violated an applicable prohibition in paragraph a.1 of this award term; or

2. Has an employee who is determined by the agency official authorized to terminate the award to have violated an applicable prohibition in paragraph a.1 of this award term through conduct that is either—

i. Associated with performance under this award; or

ii. Imputed to the subrecipient using the standards and due process for imputing the conduct of an individual to an organization that are provided in 2 CFR part 180, "OMB Guidelines to Agencies on Governmentwide Debarment and Suspension (Nonprocurement)," as implemented by our agency at *2 CFR part 1400*.

c. *Provisions applicable to any recipient* .

1. You must inform us immediately of any information you receive from any source alleging a violation of a prohibition in paragraph a.1 of this award term.

2. Our right to terminate unilaterally that is described in paragraph a.2 or b of this section:

i. Implements section 106(g) of the Trafficking Victims Protection Act of 2000 (TVPA), as amended (22 U.S.C. 7104(g)), and

ii. Is in addition to all other remedies for noncompliance that are available to us under this award.

3. You must include the requirements of paragraph a.1 of this award term in any subaward you make to a private entity.

d. *Definitions* . For purposes of this award term:

1. “Employee” means either:

i. An individual employed by you or a subrecipient who is engaged in the performance of the project or program under this award; or

ii. Another person engaged in the performance of the project or program under this award and not compensated by you including, but not limited to, a volunteer or individual whose services are contributed by a third party as an in-kind contribution toward cost sharing or matching requirements.

2. “Forced labor” means labor obtained by any of the following methods: the recruitment, harboring, transportation, provision, or obtaining of a person for labor or services, through the use of force, fraud, or coercion for the purpose of subjection to involuntary servitude, peonage, debt bondage, or slavery.

3. “Private entity”:

i. Means any entity other than a State, local government, Indian tribe, or foreign public entity, as those terms are defined in 2 CFR 175.25.

ii. Includes:

A. A nonprofit organization, including any nonprofit institution of higher education, hospital, or tribal organization other than one included in the definition of Indian tribe at 2 CFR 175.25(b).

B. A for-profit organization.

4. “Severe forms of trafficking in persons,” “commercial sex act,” and “coercion” have the meanings given at section 103 of the TVPA, as amended (22 U.S.C. 7102).
(c) An agency may use different letters and numbers to designate the paragraphs of the award term in paragraph (b) of this section, if necessary, to conform the system of paragraph designations with the one used in other terms and conditions in the agency's awards

15. NEW RESTRICTIONS ON LOBBYING (43 CFR §18)

The Recipient agrees to comply with 43 CFR 18, New Restrictions on Lobbying, including the following certification:

(1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the Recipient, to any person for influencing or attempting to influence an officer or employee of an agency, a Member of Congress, and officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying" in accordance with its instructions.

(3) The Recipient shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify accordingly. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by Section 1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

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January 22, 2009

Mr. Jason Phillips
Bureau of Reclamation
2800 Cottage Way, MP-~~140~~ 170
Sacramento, California 95825-1898

Re: San Joaquin River Restoration Program - Initial Program Alternatives Report.

Dear Jason:

My client has asked me some question about the specifics of the alternatives which were being studied in the NEPA/CEQA process. I went to the above referenced document and found only rather vague summary language in describing the particular alternatives. Could you please provide me with a more detailed statement of the alternatives under consideration or could you direct me to a resource which could provide that sort of information.

The District is trying to be prepared for fulfilling its role in this process and we would appreciate, as always, the Bureau's help in this process.

Very truly yours,

Linneman, Burgess, Telles,
Van Atta, Vierra, Rathmann,
Whitehurst & Keene

Thomas J. Keene

Thomas J. Keene

cc: Reggie Hill, Lower San Joaquin Levee District

United States Department of the Interior

BUREAU OF RECLAMATION
Mid-Pacific Regional Office
2800 Cottage Way
Sacramento, California 95825-1898

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IN REPLY REFER TO:

MP-170
ENV-6.00

FEB - 4 2009

Thomas J. Keene
Linneman, Burgess, Telles, Van Atta,
Vierra, Rathmann, Whitehurst & Keene
1820 Marguerite Street
Dos Palos, CA 93620

Subject: Letter Regarding the San Joaquin River Restoration Program National Environmental Policy Act Process and Request for a Funding Agreement

Dear Mr. Keene:

This is in response to your letter of December 23, 2008, in which you expressed concern over the National Environmental Policy Act (NEPA) review process timeline for the San Joaquin River Restoration Program (SJRRP). You also requested an agreement between the Bureau of Reclamation (Reclamation) and the Lower San Joaquin Levee District (Levee District) to fund the Levee District's participation in the NEPA process.

Reclamation believes that the participation of the Levee District in the implementation of the SJRRP is important. As the implementation of the SJRRP moves forward, the Levee District may be asked to take on additional maintenance responsibilities along the San Joaquin River. In these circumstances, it may be appropriate for Federal funding associated with the SJRRP be used to cover the costs of these activities. In light of this, Reclamation and the Department of Water Resources (DWR) have initiated discussions with the Levee District to identify specific activities of the Levee District that are a direct result of SJRRP implementation and determine whether additional funds for these activities will be required. Once agreement is reached between Reclamation, DWR, and the Levee District regarding such activities, a formal funding agreement with the Levee District may be necessary. I appreciate your willingness to help expedite the completion of such an agreement if one is deemed necessary.

Concerning funding, at the time you made your request and incurred the cited costs, Reclamation and the Levee District did not have a funding agreement in place as the basis for reimbursing such costs. As a result, we must decline your request. I would also like to clarify that the Levee District has not been designated as a cooperating agency under NEPA for the Program Environmental Impact Statement/Report (PEIS/R). The process, established in 40 CFR Section 1501.6, to request and confirm cooperating agency status, has not been initiated or executed between Reclamation and the Levee District.

I look forward to working with you as we move forward on this matter. Please feel free to contact me if you have any additional questions or concerns. I can be reached at 916-978-5455 or jphillips@mp.usbr.gov.

Sincerely,

Jason Phillips
Program Manager

cc: Reggie Hill
Secretary-Manager
San Joaquin River Levee District
11704 West Henry Miller
Palos, CA 93620

Paula Landis, P.E.
Acting Chief
Division of Integrated Regional Water Management
Department of Water Resources
San Joaquin District
3374 East Shields Avenue
Fresno, CA 93726

Craig Moyle
Public Affairs Specialist
MWH Americas, Inc.
3321 Power Inn Road, Suite 300
Sacramento, CA 95826

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February 20, 2009

Mr. Jason Phillips
Bureau of Reclamation
2800 Cottage Way, MP-140
Sacramento, California 95825-1898

Re: San Joaquin River Restoration Program - Your letter responding to my letter of December 22, 2008.

Dear Jason:

We received your letter on February 9, 2009. I have still not received a response to my letter of January 22, 2009. Might I expect that in a more timely manner than the response to my letter of December 22, 2008?

As I understand Reclamation's position, it does not have the legal authority to enter into an agreement to make third parties whole until after the legislation pending in Congress passes and, even then, it would have no authority to reimburse expenses incurred prior to the date of the reimbursement agreement. What I do not understand about you position is that, not only has Reclamation formed a task force and staffed it but it has also retained a consultant to work on this project without the legislation having passed. Presumably these people are being paid and do not have to work on the promise of being paid only when and if the legislation passes and, even then, not being paid for the work performed prior to the passage of the legislation. Presumably you are also moving forward with the NEPA compliance for the first year since you have stated in the task force meetings that you expect an initial draft of that document to be produced by some time in March. Surely the people working on that project are being paid by Reclamation. You have also stated that initial NEPA document for the rest of the period of interim flows will be out for comment this summer. Presumably you have someone working on this as well. How can Reclamation pay an outside contractor to do all of these things but then claim a lack of authority to reimburse the Levee District until legislation passes?

As for the District's status as a cooperating agency under NEPA, I have been relying on the letter which the District received on April 27, 2007, from the Regional Director of Reclamation. In that letter he stated:

> With respect to a more formal relationship for this coordination [between the Levee District and the Bureau of Reclamation], I believe including the Levee District as a cooperating agency in the National Environmental Policy Act (NEPA) process would likely be the best approach. We will be in contact with you about formalizing such an arrangement once the NEPA process is underway.

Section 1501.6 of the NEPA regulations, which sets out the basic framework for cooperating agencies, specifically states that its purpose is to emphasize cooperation among governmental agencies early in the NEPA process. It provides that the lead agency shall request the participation of each cooperating agency in the NEPA process "at the earliest possible time". The lead agency is to use the proposals of the cooperating agencies with special expertise, "to the maximum extent possible consistent with its responsibility as the lead agency." The lead agency is to meet with the cooperating agency at the request of the cooperating agency.

Because of your repeated statement about the production of a NEPA document by March, it was my understanding that the NEPA process was, in fact, underway and that the Levee District was participating in that process by participating in the meetings which you have been holding. Under Section 1502.12 of the NEPA regulations, a cooperating agency has a duty to comment on a NEPA document unless the cooperating agency is satisfied that its views are adequately reflected in the environmental impact statement. If it does not have enough information, the cooperating agency has a duty to specify any additional information it needs to comment adequately on the draft statement's analysis under Section 1503.3. We had hoped that any delays caused by the District's review of the NEPA documents could be reduced by the District's participation in these meetings. We had also understood that the District was to be reimbursed its costs, perhaps under the provisions of Section 1501.6 (b) 8, which provides that a cooperating agency would

> Normally use its own funds. The lead agency shall, to the extent available funds permit, fund those major activities or analyses if request from cooperating agencies. Potential lead agencies shall include such funding requirements in their budget requests.

In response to your statement that the "process established in 40 CFR Section 1501.6, ... has not been initiated or executed between Reclamation and the Levee District.", it has been a number of months since I first looked at Section 1501.6, but when I did look at after the letter identifying the Levee District as a cooperating agency, I saw no formal process. We took Kirk Rogers' identification of the District as a cooperating agency as a request from the Bureau of Reclamation to analyze the impact on flood protection of the River Restoration Project as a cooperating agency. The district has made no secret of the fact that it will need to contract with someone to review the Bureau of Reclamation's NEPA documents and that, while I am the District's General Counsel, I am an outside contractor and so, when the District has me participate in meetings with the Bureau of Reclamation, the District is incurring additional expenses. Since the Bureau of Reclamation was proceeding with the preparation of the NEPA documents and had contracted with a consulting firm for Craig Moyle's time and to have someone start to work on the NEPA documents, I had assumed that you had a budget. It came as a surprise to me that you either do not have one or did not plan to reimburse the District for its activities as a cooperating agency when you drafted that budget.

I would suggest to you that, if you do not have a budget for these activities you have violated federal laws and regulations. If you do have a budget, then contrary to the position you have taken in your recent letter, you do have the legal authority to reimburse the District's costs of performing the analysis of the impacts of the River Restoration process on flood protection including the work which I have performed on behalf of the District in this regard.

Very truly yours,

Linneman, Burgess, Telles,
Van Atta, Vierra, Rathmann,
Whitehurst & Keene

Thomas J. Keene

Thomas J. Keene

cc: Reggie Hill, Lower San Joaquin Levee District
Paula Landis, Department of Water Resources
Jay Punia, Central Valley Flood Protection Board

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August 13, 2009

Mr. Jason Phillips
Bureau of Reclamation
2800 Cottage Way, MP-140
Sacramento, California 95825-1898

Re: San Joaquin River Restoration Program -
Our conference call with Reggie Hill yesterday.

Dear Jason:

The Financial Assistance Agreement between the Lower San Joaquin Levee District will include the following parameters: (1) It will be for a fixed period of time, (2) It will be limited to the line item categories which were established in Reggie Hill's written estimate of the costs which the District will incur and (3) It will, at least superficially, to the total of Reggie Hill's estimate of costs which was approximately $185,000.00 for the 2009-2010 water year.

It was my understanding from our telephone conversation on each of these items that

(1)Since the agreement cannot be ready before the October 1, 2009 beginning of the Water Year, the District can send a letter requesting "incurrence of costs", which, (assuming the Bureau would agree to it and you indicated that it would), would allow the recovery of costs incurred prior to the date the Financial Assistance Agreement is signed. At the other end of the term, it is recognized by the Bureau that the District believes that it will continue to incur costs after September 30, 2010, as a result of the Interim Flows released during the 2009-2010 water year. As I understood our conversation, the District not only would be negotiating a Financial Assistance Agreement for the project after October 1, 2010, but that, if there were funds remaining in the initial Financial Assistance Agreement the District could put in a claim for those funds and receive them for these purposes.

(2) Even though the contract will be limited for costs incurred in the activities identified in Reggie Hill's estimate, the District anticipates that it will have let a contract for technical assistance in order to work effectively with the Bureau of Reclamation in developing the appropriate Operation and Maintenance methods for maintaining the River (and any affected

portion of the bypass system) while they are wet. Similarly you indicated that, if it makes better financial sense for the Bureau to stop the interim flows for some period during the summer in order to aid in the operation and maintenance of the system it will certainly consider doing so. The discussion of the expansion of line items or the addition of other line items in order to accommodate the District's need to bring in outside help can take place while the contract for the first year is being processed. This should be ample time since your people have indicated that the turn around time from the date the District submits the contract documents in their final form until the Bureau produces a contract is anticipated to be 90 to 120 days. I understood that these talks could begin once David Mooney of your staff returns from vacation.

(3) We all acknowledge that the $185,000.00 figure might be far too little and, if necessary as the year unfolds, additional funds can be added. Reggie particular wanted to point out that the numbers which he generated did not take into account different ways of operating and maintaining the system even though such different ways are reasonably anticipated because of the lack of a drying out period for the system under the regimen which will be in effect from October 1, of this year through the end of the project. He had been asked only for an estimated cost of cleaning up if the project stopped after the first year. We all realize that this would be an unreasonable expectation.

One more caveat I need to put on all of this: Reggie and I answer to the District's Board of Directors. We do not have the power to bind the District contractually. We can negotiate and attempt to develop the best contract possible for the District but the decision whether to enter into that contract or any other contract belongs to the Board of Directors. Judging from the mood of the Board of Directors at the end of the meeting on Thursday, I cannot say with any confidence that a majority of the Board will be willing to enter into any contract which they view as accommodating the River Restoration program. The members of the Board are certainly anxious to see that the restoration efforts do not, in any way, decrease the capacity of the flood control system to carry flood water. While you indicated your concurrence in this goal, it does not appear in the Settlement Agreement and your job is to effectuate the terms of the settlement agreement. As you pointed out, the Settlement Agreement does not contemplate any work of improvement in Reach 3, but it is apparent to anyone who studies this problem for very long that some work will need to be done there. Similarly the Settlement Agreement does not mention the capacity of the bypass system to carry flood flows but anyone who studies this problem very long realizes that if a segment of the bypass system is going to be used to convey Interim Flows and the Restoration Flows, some work of improvement will have to be performed in order to maintain at least the current level of flood protection. They just do not feel confident that this will be the final decision of Reclamation in carrying out the River Restoration project.

If there is anything at all in this letter which I did not put down correctly, we expect you to tell us at once. It is absolutely vital to our mutual efforts that there be no misunderstandings with regard to the issues addressed in this letter. I would ask that you send a letter confirming that you agree to all of the terms set forth in this letter but, even barring that, you failure to respond will be interpreted as your agreement and, under California law, that would constitute an adoptive admission.

We will be sending you the initial draft of the contract documents as soon as we can.

Very truly yours,

Linneman, Burgess, Telles,
Van Atta, Vierra, Rathmann,
Whitehurst & Keene

Thomas J. Keene

Thomas J. Keene

cc: Reggie Hill, Lower San Joaquin Levee District
Kevin Faulkenberry, Department of Water Resources
Jay Punia, Central Valley Flood Protection Board

Gasdick, Alicia E

From: Phillips, Jason R
Sent: Wednesday, August 19, 2009 2:01 PM
To: lsjld@elite.net
Cc: Mooney, David M; PALMER, STEVE; Gasdick, Alicia E; Perkins, Dennis W; Keene,Tom; Faulkenberry, Kevin
Subject: SJRRP - Financial Assistance Agreement follow-up

Reggie - Yesterday I received a letter in the mail from your attorney, Tom Keene, dated August 13, 2009, in which he was summarizing our conference call on August 12, 2009, on the financial assistance agreement. Reclamation will consider your concerns and get back to you. Additionally, none of the terms included in Tom's letter are binding until included in an agreement signed by the appropriate government official.

Sincerely,
Jason

Jason Phillips
U.S. Bureau of Reclamation
SJRRP Program Manager
(916) 978-5456
jphillips@usbr.gov

Gasdick, Alicia E

From: Gasdick, Alicia E
Sent: Wednesday, September 09, 2009 9:20 AM
To: Gasdick, Alicia E
Subject: FW: Lower San Joaquin Levee District

From: Tjkeene2@aol.com [mailto:Tjkeene2@aol.com]
Sent: Tuesday, September 08, 2009 2:26 PM
To: VWHITNEY@waterboards.ca.gov
Cc: lsjld@elite.net; sjrecwa@inreach.com; Phillips, Jason R
Subject: Lower San Joaquin Levee District

What follows is the text of a letter which will be going out in today's mail to you.

September 8, 2009

Division of Water Rights
State Water Resources Control Board
Attn: Ms. Victoria Whitney
1001 “I” Street, 14th Floor
Sacramento, California 95812-2000

Re: U.S. Bureau of Reclamation Petition for Temporary Transfer of Water, Permit Nos. 11885,11886, 11887

Dear Ms Whitney:

This office is general counsel to the Lower San Joaquin Levee District which operates and maintains the flood protection system between Gravelly Ford and the confluence of the San Joaquin River and the Merced River. Recently it has come to the District’s attention that there may be some question about whether the District has any agreements with USBR concerning the operation and maintenance of the various structures along the River and Bypass system for which the District is responsible during the River Restoration Program. We believe that our operations will be significantly impacted and we have been trying, for over a year, to reach an agreement at least as to reimbursement to the District for its additional expenses which will be incurred due to the implementation of the first year of this Program.

Please be advised that, in spite of our best efforts, at present we have no agreements with USBR and they have led us to believe that we should not anticipate having such an agreement sooner than four months from now, if at all.

Very truly yours,

Linneman, Burgess, Telles,
Van Atta, Vierra, Rathmann,
Whitehurst & Keene

Thomas J. Keene

cc: Reggie Hill, Lower San Joaquin Levee District

United States Department of the Interior

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2800 Cottage Way
Sacramento, California 95825-1898

IN REPLY REFER TO:

MP-170
PRJ-1.00

SEP 11 2009

Mr. Reggie N. Hill
Secretary-Manager
Lower San Joaquin Levee District
11704 West Henry Miller Avenue
Dos Palos, CA 93620

Subject: Financial Assistance Agreement with the Lower San Joaquin Levee District Related to Water Year 2010 Interim Flows

Dear ~~Mr. Hill~~: Reggie

Thank you for taking the time to talk with me on August 12, 2009, regarding the financial assistance agreement that the San Joaquin River Restoration Program (Program) is working to prepare with your agency. This letter is in response to Tom Keene's letter dated August 13, 2009, that was written to summarize key points from our August 12, 2009, conference call. I would like to clarify a few items and further describe our intent with regard to the subject agreement.

In summary, the Bureau of Reclamation (Reclamation) is currently working on a financial assistance agreement that will address the additional operations and maintenance activities that may be undertaken as a result of the Program's Water Year 2010 Interim Flows project. Under the terms of this agreement, the Lower San Joaquin Levee District (Levee District) will be reimbursed for work identified in the Statement of Work that is performed within the time period stated in the agreement, with the total reimbursement not to exceed the funding provided in the agreement.

Each item from Mr. Keene's August 13, 2009, letter is addressed below:

1. As identified in Mr. Keene's August 13, 2009, letter, the agreement cannot be ready before October 1, 2009. You may submit a letter requesting incurrence of costs for the activities within the scope of the agreement that take place on or after October 1, 2009. Although we see no challenges with authorizing pre-incurrence of costs at this time, only the appropriate government official can authorize pre-incurrence of costs. We cannot guarantee that Reclamation will authorize pre-incurrence of costs and request that you do not incur costs until you have received written authorization from the appropriate government official.

   As described above, reimbursements under the agreement will not exceed the amount awarded, and the work needs to be performed within the time period stated in the agreement. If the statement of work, the estimated costs, or the timeframe changes during the execution of the agreement, we ask that you notify us at once. Reclamation will work to determine what changes, if any, need to be made to the agreement. Any modifications to the agreement, including extending the term of the agreement, will be addressed through a written modification. We cannot guarantee that Reclamation will execute a modification and request that you do not conduct work that is outside of the agreement without prior written authorization from the appropriate government official.

We would like to work with you to develop an agreement for additional operations and maintenance activities that may be undertaken as a result of the Program's longer-term Interim and Restoration flows. We anticipate that this longer-term agreement could be in place by October 1, 2010, so long as a Scope of Work is developed and agreed upon by early next year.

2. With regard to expenses for technical assistance to better understand the changes to the Levee District's future operations and maintenance methods that may result from the implementation of the Program, we would like to work with you to better understand this effort and ways of addressing the issue. At this time, such efforts are not included in the current agreement.

   Regarding a reduction of Interim Flows for a short time period in the summer, if the Levee District identifies a significant cost savings resulting from such an action next year, Reclamation would be willing to discuss this possibility with the Settling Parties.

3. Mr. Keene's August 13, 2009, letter notes that the Levee District prepared its cost estimate based on your current operations and maintenance activities. Reclamation acknowledges this limitation to the cost estimate. As I have identified above, if the estimated costs change, please notify us at once. Reclamation will work to determine what changes, if any, need to be made to the agreement. Any modifications to the agreement will require written authorization from the appropriate government official.

With the clarifications above, I feel that we have a better mutual understanding of our discussions on our August 12, 2009, conference call. Please be advised that only the appropriate government official can agree to the terms for any future financial assistance agreement. Reclamation intends to work towards execution of a financial assistance agreement with the Levee District. However, the execution of such an agreement is governed by Federal laws and regulations and must be completed by the appropriate government official. We do not view Mr. Keene's August 13, 2009, letter as binding and representing terms that may be in a future financial assistance agreement.

We look forward to working with you as we implement the Program. Please contact me if you have any questions at 916-978-5455 or jphillips@usbr.gov.

Sincerely,

Jason R. Phillips
Program Manager

cc: Mr. Kevin Faulkenberry
Program Manager
Department of Water Resources
3374 E. Shields Avenue
Fresno, CA 93726

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October 2, 2009

Mr. Jason Phillips
Bureau of Reclamation
2800 Cottage Way, ~~MP-140~~ MP-170
Sacramento, California 95825-1898

Re: San Joaquin River Restoration Program - Operations Agreement.

Dear Jason:

Reggie Hill and I had a chance to discuss the conference call in which he participated yesterday with you and with representatives of Central California Irrigation District, the San Luis Canal Company and Frances Mizuno from the San Luis & Delta Mendota Water Authority. We are concerned on behalf of the Levee District, that changes in the way in which Sack Dam and Mendota Dam and the Mendota Pool are operated will have an impact on the Levee District's operations downstream. These impacts were not considered when Reggie developed the information for you concerning the anticipated costs to the District of the increased maintenance activities which the River Restoration Program will necessitate. Since we do not know who will be making the decisions with regard to how the upstream facilities are going to be operated it is hard, even now, to develop any sort of cost estimate with regard to the impacts to the District.

It seems apparent to us that the District needs to be a party to the Operations Agreement you are developing with CCID and SLCC. From the District's perspective, such an agreement would be in addition to and complimentary of the financial assistance agreement which is, as we understand it, already in the works, (although we have never seen a copy of it).

Since my conversation with Reggie this morning, I have read the State Water Resources Control Board's order on the temporary transfer of water and the change in place and purpose of use which was issued with regard to the first year of the River Restoration Program. It appears to me from paragraph 6 of the order itself that the SWRCB also believes that an operations agreement is needed. Presumably these will need to be in place before the interim flows are released unless you believe that enough water will be released this fall to reach the Sand Slough control structure.

I have recommended to Reggie that we have an agenda item at the Levee District's Board meeting on October 13. We look forward to hearing your thoughts before then.

Very truly yours,

Linneman, Burgess, Telles,
Van Atta, Vierra, Rathmann,
Whitehurst & Keene

Thomas J Keene

Thomas J. Keene

cc: Reggie Hill, Lower San Joaquin Levee District
Chris White, Central California Irrigation District
Chase Hurley, San Luis Canal Company

United States Department of the Interior

BUREAU OF RECLAMATION
Mid-Pacific Regional Office
2800 Cottage Way
Sacramento, California 95825-1898

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IN REPLY REFER TO:

MP-170
PRJ-1.00

OCT 15 2009

Mr. Reggie N. Hill
Secretary-Manager
Lower San Joaquin Levee District
11704 West Henry Miller Avenue
Dos Palos, CA 93620

Subject: San Joaquin River Restoration Program – Operations Agreement

Dear Mr. Hill:

This letter responds to correspondence from Mr. Thomas J. Keene dated October 2, 2009. Mr. Keene expressed concern that your estimate of the anticipated costs to the Lower San Joaquin Levee District (District) for the increased maintenance activities as a result of the San Joaquin River Restoration Program (Program) may be incorrect because certain assumptions you made regarding the operation of Mendota Dam and Sack Dam may have been incorrect when you developed information for such costs.

Reclamation is willing to meet with you to discuss any changes that may need to be made to the scope of work to reflect the new assumptions. While these discussions take place, I would recommend that we continue moving forward with processing and awarding the existing agreement, which is currently scheduled to be awarded at the end of November. Getting this agreement awarded right away without making changes will ensure that funding is available earlier and that it is available when needed. If we modify the existing scope of work now, it will delay the award altogether and delay the availability of funds.

I understand that Interim Flows represent a change from historical conditions and that the lack of experience with similar flows makes scoping potential work and estimating the associated costs difficult for the District. If the scope of work or costs change from those anticipated in the agreement, Reclamation will work with the District to determine what changes, if any, need to be made to the agreement.

With regards to the on-going discussions for an operations agreement with the Central California Irrigation District, San Luis Canal Company, and San Luis & Delta Mendota Water Authority, I welcome District participation as a party in these discussions.

Reclamation will contact you to further discuss your concerns on the scope of work for maintenance activities. Please contact me if you have any questions at 916-978-5455 or jphillips@usbr.gov.

Sincerely,

Jason R. Phillips
Program Manager

cc: Mr. Kevin Faulkenberry
Program Manager
Department of Water Resources
3374 E. Shields Avenue
Fresno, CA 93726

Mr. Christopher White, P.E.
General Manager
Central California Irrigation District
P.O. Box 1231
Los Banos, CA 93635

Mr. Chase Hurley
General Manager
11704 W. Henry Miller
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November 11, 2009

Mr. Donald R. Glaser
Regional Director
Bureau of Reclamation
2800 Cottage Way
Sacramento, California 95825-1898

Re: San Joaquin River Restoration Program
Your letter of November 10, 2009 to Steve Chedester

Dear Mr. Glaser:

We have not been introduced. I serve as General Counsel to the Lower San Joaquin Levee District. Steve Chedester shared your letter with the District, presumably since the Levee District was discussed in one of the paragraphs of that letter. In reviewing it, the District felt it was appropriate to respond directly to you about some of the statements you made and the position which you have set forth for the Bureau of Reclamation.

Presumably the Bureau of Reclamation is working on a reimbursement agreement with the Levee District. We have been told this for two years and have yet to see a draft of the entirety of that document. One of the consequences of this is that we have no way of knowing whether there is any provision in the document for indemnification of the Levee District by the Bureau of Reclamation. Because of the District's concern in this regard, I have written to Jason Phillips to state that the Levee District wants to be included in the Operations Agreement being negotiated by the Central California Irrigation District.

As you no doubt are aware, the Mariposa Bypass and the Eastside Bypass north of Washington sit in easements for the flowage of flood waters. The Bureau of Reclamation has not thus far gained an expansion of the scope of the existing easements, a new non-exclusive easement or even a license agreement with these land owners for the passage of either interim or restoration flows. It appears from some of the documentation, (particularly the Final Environmental Assessment and Finding of No Significant Impact/Initial Study and Mitigated Negative Declaration) that the Bureau of Reclamation plans to give the Levee District the discretion once the water reaches the structure at the head of the Mariposa Bypass as to which bypass to use. If a landowner downstream of that bifurcation wants to sue for trespass because of a lack of easement or license for the passage of non-flood waters, the Levee District will be an indispensable party. The Levee District needs an operations agreement so that it can have a contractual right to compel the Bureau of Reclamation to pay the cost of the Levee District's defense and indemnify it for any liability associated with the passage of these waters.

It seems to us that, from the Bureau of Reclamation's perspective, you should want an operations agreement with the District in order to have a right to direct the District on where to send restoration flows. For example, recently the Restoration Administrator suggested diverting Interim Flows into the Chowchilla Canal Bypass during the construction of the improvements contemplated in Reach 2 b. The Levee District is under no obligations to make this happen without an operations agreement, the essential provision of which would be an agreement for the Bureau of Reclamation to defend, indemnify and hold the District harmless from any liability which arises from the passage of water from the River Restoration Project.

We believe that, to send non-flood waters down the River to the Eastside Bypass, as you suggest, without gaining permission from the landowners adjacent to the Bypass for their passage, the Bureau of Reclamation is taking unfair advantage of the Levee District's position at the downstream end of the lower San Joaquin River. We are faced with three choices: (1) send the water down Reach 4 B, which, as you are aware, would flood farms in that area, since the River has been too silted up in that area for generations to allow the passage of significant amounts of water; (2) send the water all the way down the Eastside Bypass and so trespass on the property adjacent to the Eastside Bypass and run the risk fo being sued by one or more of these property owners or (3) send the water down the Eastside to the Mariposa Bypass and then down the length of the Mariposa Bypass, and so trespass on the property adjacent to the Mariposa Bypass and run the risk of being sued by one or more of these property owners.[1] This is hardly consistent with the promise in the legislation for there to be no third party impacts.

The position which you set forth in your letter is news to us. We know of no law which says that the fact water has not flowed down Reach 4 B as you put it, for decades, in any way

[1]This actually creates additional potential liability. As we have explained on a number of occasions to Jason Phillips and again, recently, in response to the Final Environmental Assessment and Finding of No Significant Impact/Initial Study and Mitigated Negative Declaration, to get the water into the Mariposa Bypass would require ponding in order to get the water over the elevated entrance point. This necessitates the backing up of the water in the Eastside Bypass which interferes with one landowner's mining of sand from the bypass adjacent to his farm upstream of the bifurcation structure.

expands the scope of the easement in which the Eastside and Mariposa Bypasses were constructed to allow for the passage of anything but flood waters. The Bypasses are not natural water ways. They are owned by the State of California which has already taken the position that the easements in question will not allow for the passage of restoration flows because they are not flood waters, (enclosed is a copy of the memorandum written to that effect by the Department of Water Resources legal counsel which was provided to the Levee District and to Jason Phillips in November of 2008). Presumably the land owners will agree with the State of California, Department of Water Resources and bring suit against the Levee District and the Bureau of Reclamation. But again, from the Levee District's perspective, it does not matter who wins or loses that case because the Levee District will be broke long before the final decision in such litigation.

Please, do not, as your letter suggests is your intention, leave the Levee District caught between the landowners along the bypasses and the Bureau of Reclamation. You would be condemning us to being necessary parties to litigation which we cannot afford and do not want. Instead, give us an indemnification clause in either the Financial Assistance Agreement which is supposedly in the works or as a party to the Operations Agreement you are negotiating with the exchange contractors or in our own Operations Agreement.

Very truly yours,

Linneman, Burgess, Telles,
Van Atta, Vierra, Rathmann,
Whitehurst & Keene

Thomas J. Keene

Thomas J. Keene

cc: Honorable Diane Feinstein, United States Senate
Honorable Barbara Boxer, United States Senate
Honorable Dennis Cardoza, House of Representatives
Honorable George Radanovich, House of Representatives
Honorable Jim Costa, House of Representatives
John Engbring, U. S. Fish & Wildlife Services
Rhonda Reed, National Marine Fisheries Service
Jeffrey R. Single, California Department of Fish & Game
Paula Landis, California Department of Water Resources
Victoria Whitney, State Water Resources Control Board
Kathy Mrowka State Water Resources Control Board

Monty Schmidt, National Resources Defense Council
Ronald Jacobsma, Friant water Users Authority
Reggie Hill, Lower San Joaquin Levee District
Steve Chedester, San Joaquin River Exchange Contractors

State of California

The Resources Agency

Memorandum

Date: November 19, 2008

To: Paula Landis, Acting Chief
Division of Planning & Local Assistance

From: Scott Morgan, Staff Counsel
Department of Water Resources

Subject: Property rights in the Eastside Bypass held by the Sacramento & San Joaquin Drainage District

Question

Do flowage easements in the Eastside Bypass held by the Sacramento and San Joaquin Drainage District confer a right to utilize the bypass for restoration flows in conjunction with the San Joaquin River Restoration Program?

Answer

Flowage easements in the Eastside Bypass held by the Sacramento and San Joaquin Drainage District do not confer a right to utilize the bypass for restoration flows in conjunction with the San Joaquin River Restoration Program.

Background

In *NRDC et al. v. Kirk Rodgers et al.*, environmental groups sued the U.S. Bureau of Reclamation and Central Valley water contractors over renewal of long-term water service contracts. A preliminary ruling favorable to the plaintiffs on key issues led to negotiation of a settlement agreement among the parties.[1]

The settlement agreement establishes dual goals of "restoring and maintaining fish populations in 'good condition' in the main stem of the San Joaquin River below Friant Dam to the confluence of the Merced River" and "reduce or avoid adverse water supply impacts to all of the Friant Division long-term contractors."

This State is participating in the San Joaquin River Restoration Program (SJRRP or "Program") pursuant to a Memorandum of Understanding (MOU) between parties to litigation and State agencies including the Department of Water Resources (DWR or Department). The SJRRP's Environmental Compliance and Permitting Workgroup prepared a draft document entitled "Initial Program Alternatives Evaluation" describing eight alternative actions designed to achieve Restoration and Water Management objectives of the Initial Program Alternatives.

[1] *Natural Resources Defense Council v. Rodgers*, U. S. Dist. Ct. (East. Dist.), Notice of Lodgment of Stipulation of Settlement, Case No. CIV S-88-1658 LKK/GGH, filed September 13, 2006

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The Initial Program Alternatives Report states that the Program intends to commence "Interim Flows" that will include water released from Friant Dam in accordance with the Restoration Flow schedule contained in the Settlement no later than October 1, 2009, and continuing until full Restoration Flows begin. The Program has contemplated different scenarios for the interim Flows, including releasing different volumes of water and alternate fates for whatever water is released. One of the options being considered is to use the Eastside Bypass in lieu of the natural river channel for at least part of the flow.

The Eastside Bypass was constructed by the Department of Water Resources on behalf of the State Reclamation Board (now the Central Valley Flood Protection Board, hereinafter "Board") as part of the Lower San Joaquin Flood Control Project. The LSJFCP is a joint State-Federal flood control project that has been authorized by both Congress[2] and the California Legislature.[3]

The original plan for the LSJFCP involved the construction of structural flood control features downstream of the mouth of the Merced River by the federal government and purchase of flowage easements over a significant swath of low-lying, flood-prone valley real estate by the State. The easements above the mouth of the Merced River covered an area of over 100,000 acres that would be used as a natural detention basin. In 1945, when the State authorized the project, the cost of flowage easements over this area was estimated at less than $1 million. Eight years later the estimated cost of acquiring those easements had risen to over $12 million and the land, which had previously been viewed as relatively unproductive, was now considered valuable agricultural land. Because of the magnitude of change to the original project design, the Board lacked authority to unilaterally change the project.[4] Ultimately, the revised project was approved by Congress[5] and the State legislature.[6]

Property acquired for the revised Lower San Joaquin Flood Control Project, including construction of the Eastside Bypass, required acquisition of property rights. Those rights are held by the State through the Sacramento and San Joaquin Drainage District. The Central Valley Flood Protection Board has management and control over the District, including its property.[7]

Property Rights in the Eastside Bypass

The Department's office of Land & Right of Way has identified 44 different deeds containing the description of property rights conveyed to the District for the purpose of constructing the Lower San Joaquin Flood Control Project. Most of these deeds convey property rights in multiple parcels. The District owns a

[2] Federal Flood Control Act of 1944 (58 Stat. 887)
[3] State Water Resources Act of 1945 (Stat. 1945, Ch. 1514, p. 2834, § 33)
[4] 24 Atty.Gen.Opin. 259, Dec. 23, 1954.
[5] Ch. 687, Pub. 327, Aug. 9, 1955
[6] Water Code § 8621 (Stats.1955, Ch. 1048)
[7] Water Code § 8502

significant amount of the property of the Bypass in fee, and over the rest it holds one or more easements, some of which are subject to reservations on behalf of the fee holder. (See Map) The District owns most Bypass lands in fee from its southern end to about the Sand Sough Connector. From the Sand Slough Connector north, however, the District holds mostly easements. The easements provide different rights based upon what was needed at a particular location, and include such rights as to excavate to construct San Joaquin River levees, construct, operate & maintain San Joaquin River Flood Control project, establish roads for use in flood control project, locate public facilities, spoil material during construction of the San Joaquin River Flood Control project, or clear vegetation the Board determines interferes with the free flow of water. (All deeds are reproduced in PDF in the attachment.) Of particular interest here are those easements that confer the right to flow water resulting from this or any future San Joaquin River Flood Control project. The following language, from Deed 2496, is typical:

> To flow, without recourse by grantor, his successors or assigns, for compensation for past, present or future damage therefrom, any and all waters which may as the result of any present or future flood control project of the State of California, from time to time inundate the said real property.

The question is whether such language confers the right to pass restoration flows through the Bypass.

Easements

An easement is a legal interest in the lands of another.[8] It confers a restricted right to specific, limited, definable use or activity upon property that is something *less* than fee ownership.[9] Easements may be created in a variety of ways, including through express grant or reservation (the method by which the Sacramento and San Joaquin Drainage District acquired property rights in the Eastside Bypass at issue here).[10]

An easement founded upon a grant confers *only* those interests expressed in the grant and those necessarily incident thereto pass from the owner of the fee.[11] A clear and specific grant for a particular use is decisive as to the scope of rights contained in an easement.[12]

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[8] *Eastman v. Piper*, 68 Cal.App. 554, 560, 229 P. 1002, 1004 (Cal.App. 2 Dist. 1924)).
[9] *Scruby v. Vintage Grapevine, Inc.*, 37 Cal.App.4th 697, 702 (Cal.App.1.Dist.1995)
[10] Civ. Code § 806
[11] *City of Pasadena v. California-Michigan Land & Water Co.*, 17 Cal.2d 576, 579, 110 P.2d 983, 985 (CA.1941)
[12] *Wilson v. Abrams*, 1 Cal.App.3d 1030, 1035, 82 Cal.Rptr. 272, 275 (Cal.App. 1969)

That said, it is understood that, as one court observed, the world moves.[13] In recognition of this (and in spite of the above-mentioned general rules), easements created for one use *may* be put to another use through application of what is sometimes described as the "doctrine of shifting uses." The idea is that an easement granted for one purpose may be used for another – including a purpose that could not have been imagined at the time the original grant was made. Generally speaking, uses that are within the reasonable contemplation of the parties in terms of the purpose of the easement, and may be undertaken without surcharging the easement are permissible, but uncontemplated, abnormal uses, or uses that increase the burden on the underlying property are not.[14]

Two factors are especially important. First, whether the new use is part of the natural evolution of things and, second, whether the new use materially increases the burden on underlying property.[15] So, for example, an easement for a public road could be used for the construction and operation of a railway, which occupies the same space and is meant for the same purpose,[16] but not to install electric power lines, which is a discrete purpose.[17] If the owner of the easement attempts to change the character of an easement, the owner of the servient estate may seek, and may be granted an injunction to stop the unauthorized use.[18]

Although the use to which an easement may be put is elastic, it is not infinitely so. The default rule is to read the express terms of the grant, and limit the scope of the easement to precisely those terms. In certain circumstances, where it is eminently reasonable to do so, the express terms of the grant may be read so as to permit uses of the easement that are functionally equivalent to those expressly authorized. This flexibility is limited by two requirements. First, the sought after use must indeed be the functional equivalent of the use authorized. Second, the new use cannot surcharge the servient estate.

Although the Eastside Bypass easements do not contain language suggesting they may be used for restoration flows, the grant for flood flows is extremely broad. The easements provide a right to inundate property from "any and all waters ... of any present or future flood control project." An alternate question arises whether certain SJRRP flows, if characterized as "flood" flows, would be allowed by this language. The answer hinges on the word "characterized."

Without doubt, existing easements confer upon the Board the legal rights it would need to use the Bypass for virtually any flows associated with a flood control

[13] *Montgomery v. Santa Ana & W. Ry. Co.*, 104 Cal. 186, 192-193, 37 P. 786, 788 (Cal.1894)
[14] *Wall v. Rudolph*, 198 Cal.App.2d 684, 692, 18 Cal.Rptr. 123, 128 (Cal.App.1961)
[15] Salvaty v. Falcon Cable Television, 165 Cal.App.3d 798, 803, 212 Cal.Rptr. 31, 34 - 35 (Cal.App. 2 Dist.,1985)
[16] *Montgomery v. Santa Ana & W. Ry. Co.*, 104 Cal. 186, 192-193, 37 P. 786, 788 (Cal.1894)
[17] Brown v. Voight, 112 Cal.App.2d 569, 572, 246 P.2d 698, 700 (Cal.App. 4 Dist.1952)
[18] Vestal v. Young, 147 Cal. 715, 717, 82 P. 381, 382 (Cal.1905)

project. If the Board, in cooperation with the Corps, designed a flood project that inundated the Bypass in the same manner as the restoration project, the existing easements would be sufficient for that purpose.

The plan here is not for the Board or the Corps to develop a new flood protection project that imposes new or different burdens on existing easements – although the easement language would allow this. The plan of the SJRRP is to restore flows for the benefit of the fishery. Although a flood project might obtain the same result by way of a different path, to convert the restoration project into a flood project as a pretext to avoid paying for the necessary property rights would likely be understood as such by the courts.

Conclusion

The express terms of the easements granted here are clear on their face: the board acquired the right to flow any and all waters from this or any future flood control project. The rights acquired are relatively broad in so far as they relate to flood flows. The board did not, however, acquire the right to flow any *other* waters across this land.

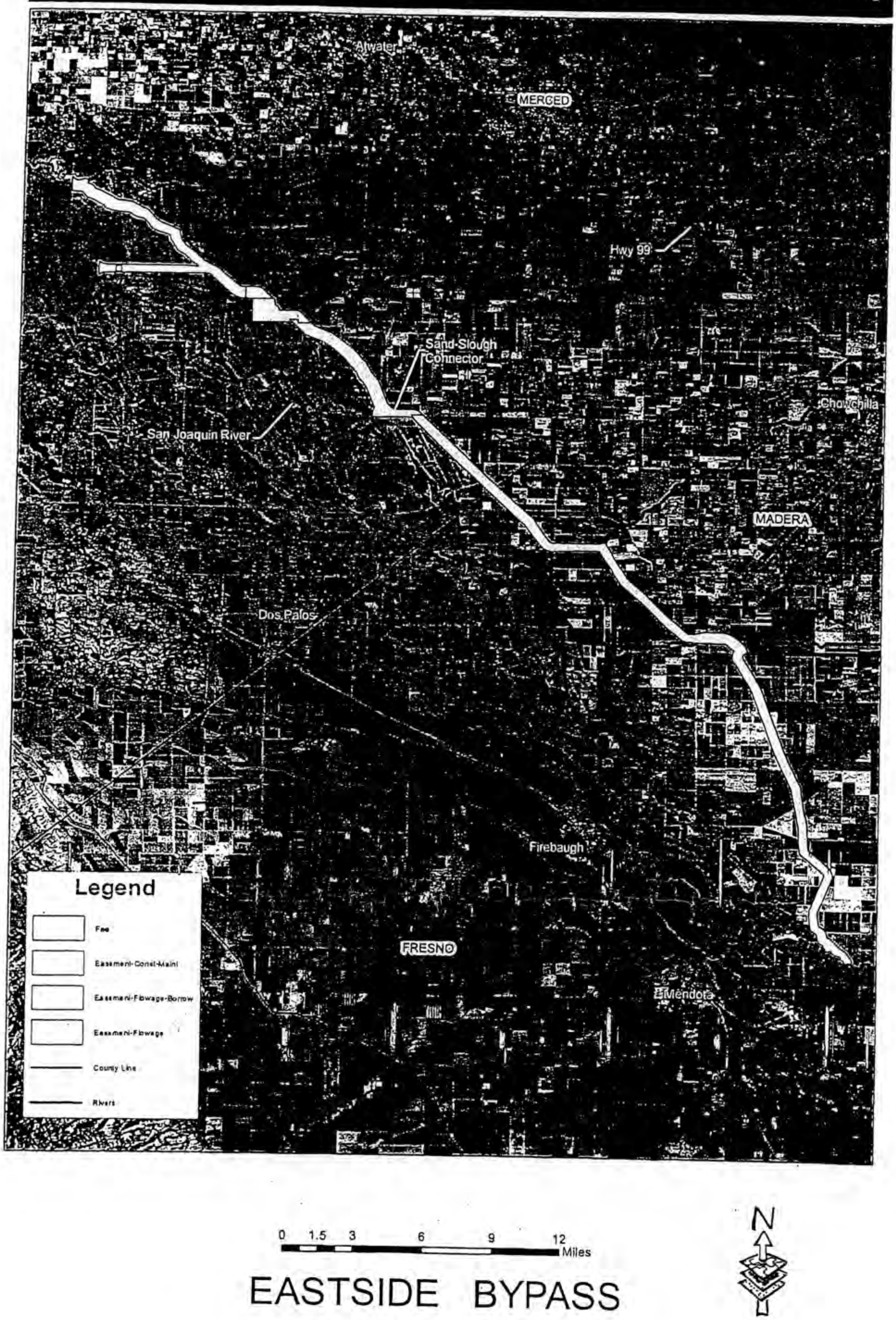
The introduction of restoration flows into the Eastside bypass, unless restricted to those stretches of the Bypass owned in fee, will require the acquisition of additional property rights. Easements held by the state do not cover this activity.

Although the State holds broad property rights to inundate the Eastside Bypass with flood waters, simply redefining the project as a "flood" project is unlikely to succeed in allowing the introduction of restoration flows without acquiring additional property rights. However, in determining the value of those rights, the incremental burden imposed upon the fee owner should not include any burden from additional flood flows for which existing easements have already provided compensation.

Attachment

cc: Ward Tabor
Laurence Kerckhoff
Bob James

Sacramento & San Joaquin Drainage District Property



EASTSIDE BYPASS

7-1596B (9-89)
Bureau of Reclamation

BUREAU OF RECLAMATION

OFFICIAL FILE COPY		
DATE	SURNAME	CODE
12.7.09	PALACHAT	3818

DEC 7 2009

MP-3818

Mr. Reggie Hill
Lower San Joaquin Levee District
11704 West Henry Miller Avenue
Dos Palos, California 93620

Subject: Proposed Cooperative Agreement R10AC20009 – Operation and Maintenance of Flood Project Facilities Impacted By San Joaquin River Restoration

Dear Mr. Hill:

Enclosed for your review and signature are three copies of proposed subject Cooperative Agreement in the amount of $184,833.64.

If this agreement is acceptable, please have an **authorized official** sign and return all copies to the above address, Attention: Jeff Palachat, **MP-3818, as expeditiously as possible.** Note Part I section **8.1 RECIPIENT'S KEY PERSONNEL**. Please confirm that the information is accurate. Upon receipt by Reclamation, an executed copy of this agreement will be returned to you.

Also, the maintenance of registration on the Central Contractors Registration (CCR) http://www.ccr.gov/, including renewal, is the responsibility of the recipient. It is imperative that recipients working with the federal government maintain an "Active" status in CCR as financial agreements will be awarded and payments made only to "Active" recipients. Your CCR registration expires November 17, 2010.

Furthermore, it is essential that recipient not only maintain an "**Active**" status in CCR, but also comply with Provision Part I section **9. REPORTING REQUIREMENTS AND DISTRIBUTION**, of the agreement, in order for payments to be made.

If you have any questions, please contact the undersigned at (916) 978-5146 or email spalachat@usbr.gov.

Sincerely,

(sgd)

Sataporn J. Palachat
Grants Officer

United States Department of the Interior

IN REPLY REFER TO:

BUREAU OF RECLAMATION
Mid-Pacific Regional Office
2800 Cottage Way
Sacramento, California 95825-1898

TAKE PRIDE IN AMERICA

MP-170
PRJ-1.00

FEB 4 2010

Mr. Reggie N. Hill
Secretary-Manager
Lower San Joaquin Levee District
11704 West Henry Miller Avenue
Dos Palos, CA 93620

Subject: Financial Assistance Agreement with the Lower San Joaquin Levee District Related to Water Year 2010 Interim Flows and Use of the Eastside and Mariposa Bypasses to Convey Such Flows

Dear Mr. Hill:

This letter is in response to Tom Keene's letter dated November 11, 2009, regarding the financial assistance agreement that the Bureau of Reclamation is preparing to address the additional operations and maintenance activities that may be undertaken by the Lower San Joaquin Levee District (Levee District) as a result of the San Joaquin River Restoration Program's (SJRRP) Water Year 2010 Interim Flows Project. In his letter, Mr. Keene expressed concerns with regard to the use of the Eastside and Mariposa bypasses to convey Interim and Restoration flows that I will also address in this letter. The Lower San Joaquin River Flood Control Project (Flood Control Project), authorized by Congress in 1944 to protect irrigated agricultural lands and associated developments, is operated and maintained by the Levee District under the Flood Control Project's Operation and Maintenance Manual for Levee, Irrigation and Drainage Structures, Channels and Miscellaneous Facilities (Flood Control Manual). Maintaining or improving the existing flood carrying capacity of the Flood Control Project is important to both the Levee District and the SJRRP.

I understand that the Levee District may need to undertake additional operation and maintenance activities as a result of the Water Year 2010 Interim Flows Project. Reclamation prepared a financial assistance agreement that will reimburse the Levee District for these additional activities and the agreement is awaiting your signature. Additionally, we would like to work with you to develop a second, long-term agreement with the Levee District for future operations and maintenance activities that may be undertaken as a result of the SJRRP's Interim and Restoration flows. We anticipate that this long-term agreement could be in place by October 1, 2010, so long as a Statement of Work is developed and agreed upon by early 2010. These agreements are separate from the operations agreements being negotiated by the Central California Irrigation District.

We are aware that the lands held in the Eastside and Mariposa bypasses are subject to easements generally executed in the early 1960s between the landowner and the Sacramento and San Joaquin Drainage District. These easements generally allow for the construction, reconstruction, enlargement, repair, operation, and maintenance of the Flood Control Project. These easements also generally allow for flowing "any and all waters which may, as a result of any present or future flood control project of the State of California, from time to time inundate the said real property." In Mr. Keene's letter, he expressed concerns that these flowage easements may not allow for the use of the bypasses to route Interim Flows into the Eastside and Mariposa bypasses and that new or expanded easements are needed.

As previously stated, the Flood Control Project is operated and maintained by the Levee District consistent with the Flood Control Manual. The Flood Control Manual includes operating criteria for the San Joaquin River Control Structure, that regulates flows into Reach 4B1, and the Sand Slough Control Structure that regulates flows into the Sand Slough and Eastside Bypass. Specifically, the Flood Control Manual states that "the first 50 cfs [cubic feet per second] of flow in the river will be diverted into Sand Slough and that all flows in excess thereof will be diverted as equally as possible between the river and Sand Slough" (Flood Control Manual page 95). The Schematic Diagram of Design Flows for Adopted Plan, Appendix D of the Flood Control Manual, shows a design capacity of 1,500 cfs in the San Joaquin River below the San Joaquin River Control Structure. The Flood Control Manual states:

> "... the channels of the project shall be maintained and kept clear of regrowth of vegetation. This is necessary as regrowth of vegetation will change the flood flow characteristics of the project channels. The purpose of channel maintenance is to insure that the channel is kept in as good a condition as when the channel was constructed" (Flood Control Manual pages 65, 66)

The Levee District's current and historical practice to not maintain the San Joaquin River channel from the San Joaquin River Control Structure at Sand Slough to the confluence with the Mariposa Bypass deviates from the Flood Control Manual. Flows have not been allowed to pass into the natural river channel at that location for many decades although the Flood Control Manual specifies splitting flows at the Sand Slough Control Structure such that flows in the river would be diverted at the structure as equally as possible between the river and Sand Slough after the first 50 cfs is diverted into the Sand Slough. The Levee District's operation of the San Joaquin River Control Structure as part of the Flood Control Project has resulted in this structure functionally becoming a permanent diversion point and all river flows now pass through the Sand Slough and the Eastside Bypass. We anticipate that the Levee District will continue to operate the Flood Control Project as it has for more than 40 years, routing any and all waters reaching the Sand Slough Control Structure into the bypass system to avoid damages in Reach 4B1 of the San Joaquin River. All flows routed at this point into the bypass system are a result of the Flood Control Project and thus, routing these flows into the bypass system is consistent with the current flowage easements.

In Mr. Keene's letter, he noted in several places that the Levee District is seeking indemnification for actions taken related to the Interim and Restoration flows. There is no mechanism for Reclamation to provide such indemnification as this would be in violation of the Anti-Deficiency Act (31 U.S.C. § 1341). However, Reclamation is working to address similar concerns raised by the Central California Irrigation District, the San Luis Canal Company, and others by preparing two separate agreements. The first agreement addresses the legal liability that these facility owners and/or operators believe may be associated with operating their facilities to pass the Interim Flows. The second agreement is an operations plan for tracking and, if necessary, reducing Interim Flows. It is my understanding that the Levee District is part of these discussions and is considering being a signatory to these agreements. These agreements would be the appropriate mechanism to address the Levee District's concerns.

We remain committed to working closely with you in the planning, design, and implementation of the Settlement and Public Law 111-11. If you have any questions, please contact me or Mr. Jason Phillips at 916-978-5456 or jphillips@usbr.gov.

Sincerely,

Donald R. Glaser
Regional Director

cc: Honorable Dianne Feinstein
United States Senate
Washington, DC 20515

Honorable Barbara Boxer
United States Senate
Washington, DC 20515

Honorable George Radanovich
House of Representatives
Washington, DC 20515

Honorable Dennis Cardoza
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Continued on next page.

Continued from previous page.

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Rathmann, Whitehurst & Keene
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LAW OFFICES OF
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RATHMANN, WHITEHURST & KEENE

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MP170	Copy	J. Bullis 3/3/10
MP115	cy rcd	

February 26, 2010

Mr. Donald R. Glaser
Regional Director
Bureau of Reclamation
2800 Cottage Way
Sacramento, California 95825-1898

Re: San Joaquin River Restoration Program
Your letter of February 4, 2010 to Reggie N. Hill

Dear Mr. Glaser:

Once again we must take issue with the position which the Bureau of Reclamation has taken with regard to the land owners adjacent to the Eastside Bypass and the Mariposa Bypass. Your position, as the Levee District understands it, is as follows: The easements in which the Eastside Bypass and Mariposa Bypass were constructed provide that they are to allow water:

> To flow, without recourse by grantors, their successors or assigns, for compensation for past, present or future damages therefrom, any and all waters which may as a result of any present or future flood control project of the State of California, from time to time inundate the [grantor's property].

Reach 4 B of the River silted up because the Levee District found that it was not cost effective, from a flood control perspective, to keep it clear. As a consequence, any water which would normally go down Reach 4 B of the River must necessarily now go down the Eastside Bypass, (where it may or may not be diverted into the Mariposa Bypass). You seem to believe that, under this set of facts, the interim flows enter the bypasses "as a result of . . .[the] flood control project", and, therefore, are within the scope of the easements.

Your logic is deeply flawed. The Levee District's actions or inactions cannot legally increase the burden on the lands over which the bypass easements are located. If, by an action, it did increase the burden, the landowners would have a valid claim for inverse condemnation – that is to say a taking of an additional property interest from the landowners without paying just

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compensation. However, the Levee District is not the one sending water which is unnecessary for the flood protection project down the River. That water is being sent down the River by the Bureau of Reclamation as a part of the river restoration project. Its purpose is river restoration and not flood protection. From the perspective of the landowners, this constitutes a taking of a property interest without just compensation and a trespass. They never agreed to have the restored River run through their property -- they only agreed for flood waters to run across their property.

There is very little question but that your interpretation will get both the Levee District and the Bureau of Reclamation sued. The Levee District does not want to be sued and, if it is sued, will probably not be able to bear the cost of an effective defense. Therefore, from the Levee District's position, it does not matter who is right or wrong. If the District gets sued, it will be a catastrophe, whether it wins or not.

However, for the record, the Levee District would like to point out some facts. Reach 4B1 of the River, insofar as the Levee District can tell, never took the 1,500 cubic feet per which it was designed to take. The soil there is extremely sandy. Low flows not only allow silt to accumulate, but, because of the area's soil conditions, the banks of River would slough into the channel, creating further constrictions. This part of the flood protection project was inadequately designed. While, it is certainly true that the Levee District did stop its efforts to keep the channel in Reach 4B1 cleared, (because it was not cost effective to do otherwise,)[1] the Levee District believes that this defect in the design of the flood protection project led inevitably to the present condition of Reach 4 B. It was impossible to maintain this reach of the River in a cost effective manner. The failure of Reach 4 B goes more to problems with the initial design by DWR, with approval by the Army Corp of Engineers and, ultimately to the fact that the Bureau of Reclamation built Friant Dam than to the Levee District's fiscal decision to avert channel clearing activities. Once the dam was built, the volume and, therefore, the velocity of the water going down the River was not sufficient to maintain a channel rid of obstructions such as sediment deposition like Reach 4B1.

Again, the District believes that, without the River Restoration Project, the District would not be sued over the condition of Reach 4 B. With the River Restoration Project, it will be sued. The Levee District cannot afford to be sued – whether it wins the suit or not. We again urge you to change course.

---

[1] It should be remembered that the Levee District was not created for the purpose of protecting a river but for the protection of people and property from floods.

Your letter mentions your negotiations with San Luis Canal Company and Central California Irrigation District in which "Reclamation is working to address similar concerns". The Levee District is a part of the negotiations between Reclamation, CCID and SLCC on an Operations Agreement. Up until now, Reclamation has resisted any suggestion that anything like an indemnification might be a part of the Operations Agreement. The Levee District has, since before the Operations Agreement, negotiated with Reclamation and Financial Assistance Agreement for the purpose of reimbursing the Levee District for the costs it incurs as a result of the river restoration activities. In that negotiation Reclamation has also continued to resist any suggestion of an indemnification or any other mechanism to address the Levee District's concerns. Reclamation's insistence on not addressing this issue is the reason why the Levee District has not entered into either an Operations Agreement or a Financial Assistance Agreement with Reclamation.

Finally, we were disturbed by your statement that you "anticipate that the Levee District will continue to operate the Flood Control Project as it has for more than 40 years, routing any and all waters reaching the San Slough Control Structure into the bypass system to avoid damages in Reach 4B1 of the San Joaquin River." As we understand the Settlement Agreement, paragraph 11(a)(3), Reclamation will be modifying Reach 4B1 "to the extent necessary to ensure conveyance of at least 475 cfs". We understood that, after this modification was completed and on line, the Secretary of the Interior, in consultation with the Restoration Administrator and the concurrence of the National Marine Fisheries Service and the Fish and Wildlife Service, would determine whether to make further modifications to Reach 4B1 so that it could convey 4,500 cfs. If this modification does occur, it will totally eliminate the problem.

The District has advocated through the comment time period on the settlement and the environmental review of the project for the final modification of Reach 4B1 so that it will accommodate 4,500 cfs. We still believe that this should be done both to have a truly restored River and to preserve the flood protection capacity of the bypass system. It would be a shame if this went by the wayside at this point.

Very truly yours,

Linneman, Burgess, Telles,
Van Atta, Vierra, Rathmann,
Whitehurst & Keene

Thomas J Keene

Thomas J. Keene

cc: Honorable Diane Feinstein, United States Senate
Honorable Barbara Boxer, United States Senate
Honorable Dennis Cardoza, House of Representatives
Honorable George Radanovich, House of Representatives
Honorable Jim Costa, House of Representatives
John Engbring, U. S. Fish & Wildlife Services
Rhonda Reed, National Marine Fisheries Service
Jeffrey R. Single, California Department of Fish & Game
Paula Landis, California Department of Water Resources
Victoria Whitney, State Water Resources Control Board
Kathy Mrowka State Water Resources Control Board
Monty Schmidt, National Resources Defense Council
Ronald Jacobsma, Friant water Users Authority
Reggie Hill, Lower San Joaquin Levee District
Steve Chedester, San Joaquin River Exchange Contractors

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copy for MP-170
Original MP-460

March 10, 2010

Division of Water Rights
State Water Resources Control Board
Attn: Ms. Victoria Whitney
1001 "I" Street, 14th Floor
Sacramento, California 95812-2000

Re: Order WR 2009-0058-DWR

Dear Ms Whitney:

As you know, this office is general counsel to the Lower San Joaquin Levee District which operates and maintains the flood protection system between Gravelly Ford and the confluence of the San Joaquin River and the Merced River. Condition 6 of the above-referenced Water Rights Order provides as follows:

> Addition of San Slough Control Structure as a point of rediversion for conveyance through the East Side Bypass and the introduction of flow into the East Side Bypass and Mariposa Bypass, as well as the addition of points of rediversion further downstream are conditioned upon the following: (a) execution of any necessary agreement with the Central Valley Flood Protection Board to release transferred water into the East Side Canal, and (b) execution of any necessary agreement with the Lower San Joaquin Levee District for the operation, inspection, and maintenance of flood control facilities.

On Friday, March 5, the water released from Friant Dam pursuant to this Water Rights order reached the Sand Slough Control Structure. It is now in the Eastside Bypass. In spite of diligent efforts on the part of the Lower San Joaquin Levee District, there is no agreement between the Levee District and the Bureau of Reclamation with regard to the operation, inspection or maintenance of the flood control facilities. The reason for this lack of an agreement is the refusal of the Bureau of Reclamation either to enter into an agreement with the property owners along the Eastside and Mariposa Bypasses or to agree to indemnify the District from liability to those landowners for the passage of water released by this project. Furthermore, it is our understanding that the Bureau of Reclamation is of the opinion that no such agreement is required because allowing the water to go into the Eastside Bypass is not a "rediversion". The Levee District disagrees.

The Levee District hereby asks that the Division of Water Rights enforce its order and direct the Bureau of Reclamation to either cease and desist until it has an agreement with the Lower San Joaquin Levee District or face the termination of its permit. If further action by the Levee District is necessary to invoke the enforcement of the order, please advise me as soon as possible of what those steps are.

Very truly yours,

Linneman, Burgess, Telles,
Van Atta, Vierra, Rathmann,
Whitehurst & Keene

Thomas J. Keene

Thomas J. Keene

cc: Reggie Hill, Lower San Joaquin Levee District
Donald R. Glaser, Regional Director, Bureau of Reclamation
Jason Phillips, Bureau of Reclamation
Honorable Diane Feinstein, United States Senate
Honorable Barbara Boxer, United States Senate
Honorable Dennis Cardoza, House of Representatives
Honorable George Radanovich, House of Representatives
Honorable Jim Costa, House of Representatives
John Engbring, U. S. Fish & Wildlife Services
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Kathy Mrowka State Water Resources Control Board
Monty Schmidt, National Resources Defense Council
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March 24, 2010

Mr. Jason Phillips
Bureau of Reclamation
2800 Cottage Way, MP-140
Sacramento, California 95825-1898

Re: San Joaquin River Restoration Program - Reimbursement Agreement

Dear Jason:

Yesterday I reviewed my file on the Reimbursement Agreement. On January 14, 2010, I sent a letter to Jeff Palachat, the Grants Officer on this agreement, setting out a number of changes the Levee District would like to see in this agreement. He never replied directly to my letter and so yesterday I telephoned him. I understood him to say that you had been consulted about my previous letter and that he understood that he was to take no further action until we resolved the liability issues. In reviewing my letter to him I find that there are a number of changes we asked for in that letter which have little or nothing to do with liability.

While the District will still not enter into an agreement until the liability issues are resolved and the appropriate language is agreed to in either this agreement or in the Operations Agreement, we would like you to consider making the other changes requested. Therefore, at the direction of my Board, I have set forth those changes and one other which I do not believe to be controversial.

1. Instead of calling it an "Assistance Agreement" on page 1 and a "Cooperative Agreement Between Bureau of Reclamation and Lower San Joaquin Levee District For Operation and Maintenance of Flood Project Facilities Impacted by San Joaquin River Restoration" on page 3, we recommend that it be referred to as a "Financial Assistance Agreement" in both locations.

2. On page 4, paragraph 5.1, the due date of February 27, 2010 has already passed. I would suggest that this be changed to read "within thirty days of the date of execution of this agreement".

3. On page 7, paragraph 6.1.1, we want to delete the last sentence which currently reads, "If applicable, the Recipient shall also coordinate and obtain approvals from site owners and operators." This sounds as if it is the Levee District's responsibility to obtain the consent of the downstream land owners and it is not.

4. On page 9, paragraph 7.3 has the notation, "N/A" on the second line. We still believe that the date should be May of 2009, because that was the date the District first prepared a draft Reimbursement Agreement and sent it to you. We understand that your position is the date should be no earlier than October 1, 2009, the beginning of the fiscal year in which the interim flows first began. In either event, "N/A" is no longer appropriate.

Again, little of this has anything to do with the big issue of liability, indemnity and hold harmless clauses which still have to be addressed before we can finalize an agreement. Addressing these changes would be consistent with the position taken by Don Glaser at the meeting of March 17, that we continue to work on non-controversial drafting issues while we wait for the State Water Resources Control Board to act.

Very truly yours,

Linneman, Burgess, Telles,
Van Atta, Vierra, Rathmann,
Whitehurst & Keene

Thomas J. Keene

Thomas J. Keene

cc: Reggie Hill, Lower San Joaquin Levee District

United States Department of the Interior

BUREAU OF RECLAMATION
Mid-Pacific Regional Office
2800 Cottage Way
Sacramento, California 95825-1898

IN REPLY
REFER TO:

MP-170
PRJ-1.00

MAR 27 2010

Mr. Reggie N. Hill
Secretary-Manager
Lower San Joaquin Levee District
11704 West Henry Miller Avenue
Dos Palos, CA 93620

Subject: Lower San Joaquin Levee District Concerns Related to Water Year 2010 Interim Flows and Use of the Eastside and Mariposa Bypasses to Convey Such Flows

Dear Mr. Hill:

This letter is in response to Tom Keene's letter dated February 26, 2010, regarding the Lower San Joaquin Levee District's (Levee District) concerns related to the use of the Eastside and Mariposa bypasses to convey Water Year 2010 Interim Flows. I understand the issues presented in Mr. Keene's letter and would encourage the Levee District to work closely with the Bureau of Reclamation in conjunction with the United States Army Corps of Engineers (Corps), the California Department of Water Resources (DWR), and the Central Valley Flood Protection Board (CVFPB) to resolve the issues.

Mr. Keene's letter reiterated that the Levee District has concerns with Reclamation's position that existing easements are applicable for the conveyance of Interim Flows through the Eastside and Mariposa Bypasses. We continue to maintain this position for reasons stated in our February 4, 2010, letter.

In Mr. Keene's letter, he states that the channel capacity in Reach 4B1 was never 1,500 cubic feet per second (cfs) and that the Lower San Joaquin River Flood Control Project (Flood Control Project) was inadequately designed by DWR, as approved by the Corps. While Reclamation takes no position on the adequacy of the design of the Flood Control Project, this issue should be brought to the attention of the Corps and the CVFPB to rectify any design inadequacies. The channel capacities of the Flood Control Project and whether or not those capacities will be maintained should be defined prior to any significant alterations that may be required as part of the Stipulation of Settlement in *NRDC, et al. v. Kirk Rodgers, et al.* (Settlement). As stated in Mr. Keene's letter, the Settlement requires improvement of the channel capacity in Reach 4B1 to convey at least 475 cfs. This is less than the capacity that is called for in the design of the Flood Control Project. Currently, Reclamation's understanding is that, due to the way in which the Flood Control Project is operated and maintained, any flows from Friant Dam that make it downstream to Reach 4B1 must be diverted into the Eastside Bypass. Reclamation would prefer the flows to remain in the natural river channel if possible.

In his letter, Mr. Keene also states that he believes, that without the San Joaquin River Restoration Program (SJRRP), the Levee District would not be sued over the condition of Reach 4B1, and with the SJRRP the Levee District will be sued. We would like to discuss with you further why you feel that the Levee District would be sued solely because of the SJRRP. The loss of 1,500 cfs of flood conveyance capacity in Reach 4B1 over the past 40 years, which has likely increased the magnitude and frequency of flooding in the bypasses, took place long before the SJRRP was initiated. Mr. Keene also states that Reclamation has resisted indemnification of the Levee District in the agreements that we are currently working on related to Interim Flows. There is no mechanism for Reclamation to provide such indemnification as this would be in violation of the Anti-Deficiency Act (31 U.S.C. § 1341). Reclamation is committed to collaborating with the Levee District to address issues and concerns, but must do so in a manner that complies with Federal law.

We remain committed to working closely with you in the planning, design, and implementation of the Settlement and Public Law 111-11, including finding reasonable solutions to these issues. Solutions to the issues will require a better understanding of the responsibilities of each of our agencies mandated under law or contract. Reclamation has initiated discussions with DWR, the CVFPB, the Corps, and the Levee District to discuss these issues and reach agreement on these matters. I am hopeful that these discussions will be productive and will address the concerns you have presented. In addition to those copied on your letter to me, I have also copied Mr. Benjamin Carter of the CVFPB and Colonel Thomas C. Chapman of the Corps. If you have any questions, please contact me or Mr. Jason Phillips at 916-978-5456 or jphillips@usbr.gov.

Sincerely,

Donald R. Glaser
Regional Director

cc: Honorable Dianne Feinstein
United States Senate
Washington, DC 20515

Honorable Barbara Boxer
United States Senate
Washington, DC 20515

Honorable George Radanovich
House of Representatives
Washington, DC 20515

Honorable Dennis Cardoza
House of Representatives
Washington, DC 20515

Continued on next page.

Continued from previous page.

Honorable Jim Costa
House of Representatives
Washington, DC 20515

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2800 Cottage Way, Ste., W-2606
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Mr. Thomas J. Keene
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Colonel Thomas C. Chapman
U.S. Army Corps of Engineers
1325 J Street
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April 22, 2010

Mr. Donald R. Glaser
Regional Director
Bureau of Reclamation
2800 Cottage Way
Sacramento, California 95825-1898

Re: San Joaquin River Restoration Program
Your letter of March 27, 2010 to Reggie N. Hill

Dear Mr. Glaser:

In the meeting in your office on March 17, you had expressed the same conclusion that the Levee District had reached – the exchange of correspondence every few weeks between your office and the District, each telling their version of events and positions, was futile and you were going to stop the practice. Imagine how surprised we were, just two weeks later to receive another letter from you. We have delayed our response in the hope that the State Water Resources Control Board's decision would come out and resolve our underlying issue so that we can stop the exchange of ideas and positions and proceed to negotiate an agreement.

In your third paragraph you suggest that we take up with the Army Corp of Engineers the what the District sees as a design defect in Reach 4 B of the River. We have taken your suggestion to heart and such discussions are under way. We do not know what effect this may have on your obligation to increase the capacity of Reach 4 B to 475 cfs as part of the first phase of the River Restoration Project.

You indicated that you would like to discuss with the Levee District further why we feel that the District would be sued solely because of the San Joaquin River Restoration Project. We have told you again, and again, that the water which has been going down the River and diverted from Reach 4 B into the Eastside Bypass prior to the River Restoration Project is flood water. Most of it was identified as such when it was released from the upstream dams, usually by either the Bureau of Reclamation if it was released from Friant or the Army Corp of Engineers if it was released from Pine Flat. What is going to get us sued is that you are now sending down the River non-flood water which we do not legally have a right to put into the bypass system because it increases the burden on the easement for the bypass in that it adds another category of water which was never agreed to by the property owners. By now you know this as well as we do since we have told you this many times.

In your fourth paragraph, you go on to talk abut the loss of 1,500 cfs of flood conveyance capacity over the last 40 years having increased the magnitude and frequency of flooding. This is a gross misstatement of the facts. As you know, the flood project channel flow rating for the Reach 4B is 1,500 cfs on paper. This number was assigned by DWR when the flood project was constructed in the early 1960s. At that time, this river reach had a main channel, but also included a multitude of smaller channels and old sloughs that defined the area. What the flows were during the years prior to construction of the flood project has not been determined, and it may never be since there was no way to measure all these channels. Historically, the Levee District's experience has been that this reach caused flooding problems whenever flows entered into it. Since this channel caused flooding problems when flows entered it, there was no benefit to the District's goal of preventing flood damage by utilizing this Reach of the River during flood events. Certainly whatever benefit there may have been did not warrants the cost to the District and the landowners for this reach of the river being used for flood control. In other words, sending water down Reach 4 B under those conditions caused more flooding than it prevented. But again, you know all of this since we have told it to you in our prior correspondence.

In your letter you repeat once again that Reclamation is committed to collaborating with the District to address issues and concerns but you once again say that you cannot address the District's major concern: indemnification from third party liability for your sending river restoration waters down the flood control project. We have to ask why you have broken you own rule and written once again since you do not seem to have anything to add to our prior correspondence.

Very truly yours,

Linneman, Burgess, Telles,
Van Atta, Vierra, Rathmann,
Whitehurst & Keene

Thomas J. Keene

Thomas J. Keene

cc: Honorable Diane Feinstein, United States Senate
Honorable Barbara Boxer, United States Senate
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Steve Chedester, San Joaquin River Exchange Contractors

United States Department of the Interior

BUREAU OF RECLAMATION
Mid-Pacific Regional Office
2800 Cottage Way
Sacramento, California 95825-1898

IN REPLY
REFER TO:

MP-170
PRJ-1.00

MAY 24 2010

Mr. Reggie N. Hill
Secretary-Manager
Lower San Joaquin Levee District
11704 West Henry Miller Avenue
Dos Palos, CA 93620

Subject: Assistance Agreement with the Lower San Joaquin Levee District Related to Water Year 2010 Interim Flows

Dear Mr. Hill:

This letter is in response to Tom Keene's letter dated March 24, 2010, regarding the assistance agreement with the Lower San Joaquin Levee District (District) for potential increased operations and maintenance costs that may result from the implementation of the Interim Flows called for in the Stipulation of Settlement in *NRDC et al. v. Rodgers et al.* In his letter, Mr. Keene requests four changes to the assistance agreement that we sent to you in December 2009. The requested changes and our responses to these changes are provided below:

1. Mr. Keene requested that "Assistance Agreement" on page 1 and "Cooperative Agreement" on page 3 be changed to "Financial Assistance Agreement". We will not be able to make this change due to time constraints. The agreement is based on a template created by the U.S. Bureau of Reclamation's Policy Department and reviewed and approved by Solicitors within the Department of the Interior. Any changes to the official template would require a series of reviews that would not likely be timely for the project at hand. The official template uses Assistance Agreement, Cooperative Agreement, and Financial Assistance Agreement interchangeably.

2. Mr. Keene noted that the February 27, 2010, date on page 4, paragraph 5.1 has already passed and proposes to change this to "within thirty days of the date of execution of this agreement." We will make this change.

3. Mr. Keene requested that the following sentence on page 7, paragraph 6.1.1 be deleted "If applicable, the Recipient shall also coordinate and obtain approvals from site owners and operators." Mr. Keene notes that the sentence implies that it is the District's responsibility to obtain the consent of the downstream landowners. While we do not expect the District to obtain the consent of the downstream landowners for the Interim Flows, we do expect the District to already have or to obtain the consent necessary to

conduct the operations and maintenance activities under the Agreement. Reclamation will change to this sentence to read "If applicable, the Recipient shall also coordinate and obtain approvals from site owners and operators to obtain access for actions taken by the District under this Agreement."

4. Mr. Keene requested that the "N/A" on page 9, paragraph 7.3 (Pre-Award Incurrence of Costs) be changed to May 2009. Reclamation will change this to October 1, 2009. Interim Flows began on October 1, 2009, and thus, this was the first potential date that the District may have incurred operations and maintenance costs related to these flows.

Reclamation sent you the assistance agreement in December 2009 for signature. As of the date of this letter, the District has not signed the agreement. The signed agreement needs to be returned to Reclamation by June 18, 2010, or the funds set aside for this agreement will no longer be available and a financial assistance agreement will no longer be the appropriate mechanism to reimburse the District. The District would then need to pursue other avenues that may be available to it for reimbursement of costs that the District feels it has incurred as a result of the Interim Flows. If you have any questions, please contact me at 916-978-5456 or jphillips@usbr.gov.

Sincerely,

Jason R. Phillips
Program Manager

Linda S. Adams
Secretary for Environmental Protection

170 GOY 460 JMJ

State Water Resources Control Board

Division of Water Rights
1001 I Street, 14th Floor ♦ Sacramento, California 95814 ♦ 916.341.5300
P.O. Box 2000 ♦ Sacramento, California 95812-2000
FAX: 916.341.5400 ♦ www.waterboards.ca.gov/waterrights

Arnold Schwarzenegger
Governor

JUN - 3 2010

In Reply Refer
to:KDM:234

Thomas J. Keene
Linneman, Burgess, Telles, Van Atta,
Vierra, Rathmann, Whitehurst & Keene
P.O. Box 156
Dos Palos, CA 93620

Dear Mr. Keene:

PERMITS 11885, 11886 AND 11887 (APPLICATIONS 234, 1465 AND 5638) OF U.S. BUREAU OF RECLAMATION (RECLAMATION), SAN JOAQUIN RIVER IN MADERA AND FRESNO COUNTIES

On March 10, 2010, you wrote the Division of Water Rights (Division) on behalf of the Lower San Joaquin Levee District (Levee District), which operates and maintains the flood protection system between Gravelly Ford and the confluence of the San Joaquin River and the Merced River. The Levee District requests that the Division enforce Condition 6 of Order WR 2009-0058-DWR and direct Reclamation to either cease and desist until it has an agreement with the Levee District with regard to the operation, inspection and maintenance of the flood control facilities or face the termination of the permits.

In Order WR 2009-0058-DWR, the Division conditionally approved Reclamation's request for the temporary transfer of water and temporary changes, including changes to points of rediversion, under the above-captioned permits, to implement the Water Year 2010 Interim Flows Project under the San Joaquin River Restoration Program (SJRRP). Condition 6 states:

> Addition of Sand Slough Control Structure as a point of rediversion for conveyance through the East Side Bypass and the introduction of flow into the East Side Bypass and Mariposa Bypass, as well as the addition of points of rediversion further downstream, are conditioned upon the following: (a) execution of any necessary agreement with the Central Valley Flood Protection Board to release transferred water into the East Side Canal, and (b) execution of any necessary agreement with the Lower San Joaquin Levee District for the operation, inspection, and maintenance of flood control facilities.

To date, Reclamation and the Levee District have not executed an agreement for the operation, inspection, and maintenance of flood control facilities. Your March 10 letter states that the reason for lack of an agreement is Reclamation's refusal either to enter into an agreement with the property owners along the Eastside and Mariposa Bypasses or to agree to indemnify the Levee District from liability to those landowners for the passage of water released by this project.

By letter dated February 4, 2010, Reclamation states that it has prepared a financial assistance agreement to address the additional operations and maintenance activities that may be undertaken by the Levee District as a result of the Water Year 2010 Interim Flows Project. It also states that it will work with the Levee District to develop a second, long-term agreement for future operations and maintenance activities that may be undertaken as a result of the SJRRP's restoration flows. Moreover, Reclamation asserts, there is no mechanism for Reclamation to provide the indemnification the Levee District seeks because it would violate the federal Anti-Deficiency Act (31 U.S.C. § 1341). Reclamation notes, however, that it is attempting to address this concern by preparing two separate agreements to address both the legal liability issues that the facility owners and/or operators believe may be associated with operating their facilities to pass the Interim Flows and preparation of an operations plan for tracking and, if necessary, reducing Interim Flows (Operations Agreement).

As of March 17, 2010, the Levee District has not signed the Financial Assistance Agreement prepared by Reclamation. As documented in a February 26, 2010 letter from the Levee District to Reclamation, the Levee District does not want to sign any agreements without indemnification for potential liability associated with any SJRRP impacts. Without indemnification or other mechanism to address the Levee District's concerns, the district is not willing to enter into an Operations Agreement or Financial Assistance Agreement with Reclamation.

Condition 6 requires the execution of "any necessary agreement with the Lower San Joaquin Levee District for the *operation, inspection, and maintenance* of flood control facilities." (Emphasis added.) It does not require indemnification for potential liability associated with the interim flows. Reclamation has prepared a financial assistance agreement to address the operations, inspection, and maintenance activities that may be undertaken by the Levee District, and the Levee District has declined to execute the agreement for reasons not directly related to those operations, inspection, and maintenance activities. In light of these facts, the Division does not intend to take enforcement action at this time. Instead, we strongly encourage the parties to resolve this issue among themselves. The Division will continue to monitor the situation.

Katherine Mrowka is the senior staff person presently assigned to this matter. If you require further assistance, Ms. Mrowka can be contacted at (916) 341-5363.

Sincerely,

Victoria A. Whitney

Victoria A. Whitney
Deputy Director for Water Rights

cc: ✓Jason R. Phillips
U.S. Bureau of Reclamation
Mid-Pacific Region, MP-460
2800 Cottage Way
Sacramento, CA 95825-1898

Ray Sohlberg
U.S. Bureau of Reclamation
2800 Cottage Way
Sacramento, CA 95825-1898

United States Department of the Interior

BUREAU OF RECLAMATION
Mid-Pacific Regional Office
2800 Cottage Way
Sacramento, California 95825-1898

IN REPLY
REFER TO:

MP-170
PRJ-1.00

JUN 17 2010

Mr. Reggie N. Hill
Secretary-Manager
Lower San Joaquin Levee District
11704 West Henry Miller Avenue
Dos Palos, CA 93620

Subject: San Joaquin River Restoration Program Correspondence with the Lower San Joaquin Levee District (District)

Dear Mr. Hill:

This letter is in response to Mr. Tom Keene's letter dated April 22, 2010, regarding the San Joaquin River Restoration Program (Restoration Program). I believe the best process to address concerns raised in this and other correspondence received from the District is to maintain a collaborative dialogue with the District. To that end, I re-state my position from the March 17 meeting that continued exchanges of correspondence that simply reiterate historic positions are not productive. However, if the Bureau of Reclamation receives letters which raise significant issues of policy or fact, we will be compelled to respond.

Reclamation continues to desire an effective relationship with the District that respects the District's important functions and also facilitates the timely implementation of the Restoration Program.

I understand your concerns and ask that you contact me or Mr. Jason Phillips at 916-978-5456 or jphillips@usbr.gov, to meet and discuss these important issues.

Sincerely,

Donald R. Glaser

Donald R. Glaser
Regional Director

cc: See next page.

Subject: Correspondence with the Lower San Joaquin Levee District (District)

cc: Honorable Dianne Feinstein
United States Senate
Washington, DC 20515

Honorable Barbara Boxer
United States Senate
Washington, DC 20515

Honorable George Radanovich
House of Representatives
Washington, DC 20515

Honorable Dennis Cardoza
House of Representatives
Washington, DC 20515

Honorable Jim Costa
House of Representatives
Washington, DC 20515

Mr. Robert Clarke
U.S. Fish & Wildlife Service
2800 Cottage Way, Ste., W-2606
Sacramento, CA 95825

Ms. Rhonda Reed
National Marine Fisheries Service
650 Capital Mall, Ste. 8-300
Sacramento, CA 95814

Dr. Jeffrey R. Single
California Department of Fish & Game
1234 E. Shaw Avenue
Fresno, CA 93710

Ms. Paula Landis
California Department of Water Resources
3374 East Shields Avenue
Fresno, CA 93726

Ms. Victoria Whitney
State Water Resources Control Board
P.O. Box 2000
Sacramento, CA 95812

Ms. Kathy Mrowka
State Water Resources Control Board
P.O. Box 2000
Sacramento, CA 95812

Mr. Monty Schmitt
Natural Resources Defense Council
111 Sutter St., 20th Floor
San Francisco, CA 94104

Mr. Ronald Jacobsma
Friant Water Users Authority
854 North Harvard Avenue
Lindsay, CA 93247

Mr. Steve Chedester
Executive Director
San Joaquin River Exchange
Contractors Water Authority
P.O. Box 2115, 541 H Street
Los Banos, CA 93635

Mr. Thomas J. Keene
Linneman, Burgess, Telles, Van Atta,
Rathmann, Whitehurst & Keene
1820 Marguerite Street
Dos Palos, CA 93620

Mr. Benjamin F. Carter
President
Central Valley Flood Protection Board
3310 El Camino Ave., Rm. LL40
Sacramento, CA 95821

Colonel Thomas C. Chapman
U.S. Army Corps of Engineers
1325 J Street
Sacramento, CA 95814

Lower San Joaquin Levee District
11704 West Henry Miller Avenue, Dos Palos, CA 93620
Telephone: (209) 387-4545
FAX: (209) 387-4237

July 13, 2010

Mr. Benjamin Carter, President
The Central Valley Flood Protection Board
3310 El Camino Avenue, Room 151
Sacramento, CA 95821

Dear Mr. Carter:

The Board of Directors of the Lower San Joaquin Levee District, during their regular meeting on July 13, 2010, appointed an executive committee to meet and confer with a similar committee of your board, on issues of concern with the San Joaquin River Restoration Program.

The flood project we operate and maintain is an important component in allowing the area to develop its resources to the most beneficial use. The Levee District is adamant in operating and maintaining the project for its intended purpose, and is proud of its ability to provide public safety. However, there are concerns with the River Restoration Program that jeopardize our ability to maintain the project to the expected level. The Levee District's executive committee, consisting of Directors Roy Catania and Sean Howard, would like the opportunity to discuss these concerns with you. The Levee District Board feels meeting to discuss these concerns would be beneficial to them and to the Flood Board.

The importance of the Flood Board and the Levee District Board getting acquainted to each other's position with River Restoration is significant in addressing the public safety needs for the people of the Central Valley. You may contact Levee District Secretary-Manager Reggie Hill for meeting arrangements or if more information is needed. Reggie can be reached at the Levee District office (209-387-4545), by cell phone (209-769-9310) or by email (lsjld@elite.net).

Sincerely,

Lloyd Roduner, Chairman
LOWER SAN JOAQUIN LEVEE DISTRICT

LAW OFFICES OF
LINNEMAN, BURGESS, TELLES, VAN ATTA, VIERRA, RATHMANN, WHITEHURST & KEENE

EUGENE J. VIERRA
DIANE V. RATHMANN
ALFRED L. WHITEHURST
THOMAS J. KEENE

PHILLIP R. McMURRAY

JAMES E. LINNEMAN, OF COUNSEL

L. M. LINNEMAN (1902-1983)
JOSEPH B. BURGESS (1902-1990)
JAY H. WARD (1942-1995)
C. E. VAN ATTA (1919-1997)
JESS P. TELLES, JR. (1920-2004)

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312 WEST 19TH STREET
P. O. BOX 2263
MERCED, CA 95344
(209) 723-2137
FAX (209) 723-0899

August 2, 2010

Honorable Dianne Feinstein
c/o Ms. Leah Russin
United States Senate
Washington, DC 20515

Re: San Joaquin River Restoration Program

Dear Ms. Russin:

This letter is written on behalf of my client, the Lower San Joaquin Levee District. The District is responsible for maintaining the levees on the Chowchilla Canal Bypass, the Eastside Bypass and the Mariposa Bypass and has some responsibility for maintaining the pilot channel of the San Joaquin River from Gravelly Ford to the confluence of the San Joaquin River with the Merced River. The District's staff is very small. It has a field crew of seven and one office person, the Secretary Manager, Reggie Hill.

The District has been actively engaged with the Bureau of Reclamation concerning the San Joaquin River Restoration project since October of 2008. It has been attempting to negotiate a financial assistance agreement with the Bureau since May of 2009, without much success. It occurred to us that your office may be able to help us get over one of the major stumbling blocks to reaching an agreement. The District has a concern that litigation will result between landowners in the District and the Bureau concerning this project. If the District is named as a party in such litigation it will be hard pressed to afford a defense, even if its position is entirely defensible. We have talked with the Bureau about their agreeing to indemnify, defend and hold the District harmless from any liability arising from the River Restoration Project. They have declined to do so citing federal law for the proposition that they are prohibited from indemnifying anyone. We recognize that they have to follow the law but the District's problems are very real to the District.

To make sure that you understand that the District's concerns have merit, I wanted to explore briefly the potential for litigation. As you may know, the Mariposa Bypass and the Eastside Bypass north of Washington Avenue in Merced County are not owned in fee title by the

State of California. This portion of the Eastside Bypass and the Mariposa Bypass are in easements, with the underlying fee title still owned by the adjacent property owners. The District and the Bureau of Reclamation disagree in their interpretations of the wording of these easements. The District's interpretation is founded, in part, on a legal opinion written by legal counsel for the California Department of Water Resources and I concur in that opinion. The District's position is that the easements allow only for the passage of flood waters and do not extend to waters which are in the system for river restoration purposes. The Bureau's position, as I understand it, is as follows: Because Reach 4 B of the San Joaquin River is impassible, for many years, the flow of the River between the Sand Slough Control Structure and the confluence of the San Joaquin River and Merced River has been diverted into the Eastside Bypass. The Bureau believes that the restoration flows will be treated no differently than any other water in the river and so do not constitute a trespass or a taking of property without just compensation. As a consequence of the Bureau's interpretation, it appears that the Bureau of Reclamation is not going to attempt to negotiate agreements with the property owners along this portion of the bypass system to allow for the passage of river restoration flows. If the District is correct in its interpretation or the Bureau is correct in its interpretation is not the point. The District cannot afford to defend any resulting litigation, whether it is on the wining side or losing side of that litigation.

The other part of this problem is that the Settlement Agreement calls for certain actions with regard to Reach 4 B of the San Joaquin River. As part of the first phase of construction, which is to be completed by 2013, the Bureau of Reclamation is supposed to make sufficient improvements in Reach 4 B to allow for the passage of at least 475 cfs of river water. At the end of the first phase, the Bureau is supposed to perform of feasibility study to determine whether to further improve the river to allow for the passage of all of the river restoration flows or, instead, use the bypass system for the balance of the River Restoration Project. What the Levee District anticipates is that, which ever choice is made, some property owners are going to have endangered species habitat going through their property. This will limit or require a change in some of the practices currently followed by farmers of these lands. While the population of salmon will be experimental during the life of the project, if the project is successful, this habitat will become established by the end of the project and the fish will be protected by the Endangered Species Act thereafter. When the landowners concerned realize this, whether they are on Reach 4 B of the River or along the Eastside Bypass and/or the Mariposa Bypass, they will do all they can to avoid their land being the subject of this project. This, the District believes, is likely to result in significant litigation.

I am sorry to be so lengthy, but I do not know how else to explain the Levee District's position. We would like to see something change so that the Levee District is insulated from liability. Perhaps this could be a change in the applicable statutes to carve out an exception for the Levee District or a provision in the act providing that the Levee District cannot be sued. We have no perfect solution. Contrary to what the Bureau of Reclamation and the Natural Resources Defense Council may believe, the District is not opposed to the River Restoration Project so long as the District is kept whole. The District's only interest is in maintaining its ability to provide at least the same level of flood protection for its land owners as it was providing prior to the River Restoration Project.

There has been considerable correspondence over the last year and a half between the Levee District and the Bureau of Reclamation and the State Water Resources Control Board concerning these issues. Your office has been copied on the correspondence between the District and Don Glaser. Please feel free to call me or use whatever form of communication you prefer if there is any additional information you need. Again, we do not have a solution to offer, only a plea for someone to get creative and help us out.

Very truly yours,

Linneman, Burgess, Telles,
Van Atta, Vierra, Rathmann,
Whitehurst & Keene

Thomas J. Keene

cc: Reggie Hill, Lower San Joaquin Levee District
Mr. Donald R. Glaser, Regional Director, Bureau of Reclamation
Steve Chedester, San Joaquin River Exchange Contractors

Attachment 3:

Daily Flows at Locations Required by Condition 7

SAN JOAQUIN RIVER OPERATIONS

October
2009

Date	Friant Dam Release	Donny Bridge *River Mile 240.9* *(Mile 1.0)*	Skaggs Bridge *River Mile 232.1* *(Mile 6.5)*	Gravelly Ford *River Mile 227.6* *(Mile 24.5)*	Bifurcation River-Side *River Mile 216.0* *(Mile 33.7)*	Mendota Dam *River Mile 204.7* *(Mile 38.0)*	Sack Dam *River Mile 182.0* *(Mile 50.0)*	Below Merced nr. Newman (NEW)[1] *River Mile 117*	Vernalis[1] *(VNS)*	Jones Pumping Plant[1] *(TRP)*	Clifton Court[1] *(CLC)*
1	215	63	31	0	0	267	0	194	1080	4097	499
2	352	63	27	0	0	252	0	213	1102	4096	497
3	352	99	38	0	0	243	0	219	1072	4101	498
4	352	153	79	0	0	237	0	217	1094	4114	499
5	352	174	132	57	0	236	0	235	1042	4096	431
6	349	187	150	87	0	235	0	237	1059	4077	494
7	348	194	160	95	0	234	0	225	1014	4102	497
8	347	205	168	104	0	233	0	237	1016	4135	481
9	350	207	172	108	0	231	0	234	1017	3908	493
10	348	209	172	113	0	231	0	244	1063	3771	498
11	350	218	176	116	0	233	0	268	1135	3772	494
12	350	222	180	126	0	235	0	277	1226	3764	493
13	350	230	196	141	0	218	0	303	1310	3746	496
14	350	303	222	171	0	194	0	445	1658	3772	483
15	350	273	232	177	0	187	0	611	1813	3946	2498
16	351	257	222	173	0	185	0	679	1808	4019	2997
17	353	250	210	167	0	184	0	688	2009	4034	4004
18	349	253	204	158	0	183	0	676	2188	4035	3997
19	348	253	204	160	0	183	0	647	2374	4056	2913
20	348	248	202	160	0	184	0	648	2545	4077	3992
21	350	248	198	154	0	186	0	582	2617	4089	2991
22	350	248	196	154	0	190	0	540	2699	4091	2992
23	349	253	200	154	0	190	0	617	2809	2390	4347
24	348	250	202	156	0	191	0	701	2797	3607	3992
25	351	250	206	162	0	195	0	763	2694	4119	3994
26	352	246	210	169	0	197	0	937	2470	4072	3774
27	352	241	210	171	0	207	0	952	2417	4088	2984
28	352	235	206	169	0	202	0	882	2420	4042	3498
29	350	226	200	158	0	198	0	875	2275	4055	3495
30	350	222	196	150	0	195	0	868	2125	4064	2510
31	349	222	192	143	0	195	0	780	1959	4089	1993
Total CFS	10,717	6,702	5,393	3,853	0	6,531	0	Available with final flow record.	Available with final flow record.		
Mean CFS	346	216	174	124	0	211	0				
Total AF	21,257	13,293	10,697	7,642	0	12,954	0				
Max. CFS	353	303	232	177	0	267	0				
Min. CFS	215	63	27	0	0	183	0				
	Peak CFS	310	236	181							
	Date / Time	14 /2000	15 / 1100	15 / 1500							

1. Provisional data from CDEC. Flow record from USGS was not available at the time of this report.

SAN JOAQUIN RIVER OPERATIONS

November
2009

Date	Friant Dam Release	Donny Bridge *River Mile 240.9* *(Mile 1.0)*	Skaggs Bridge *River Mile 232.1* *(Mile 6.5)*	Gravelly Ford *River Mile 227.6* *(Mile 24.5)*	Bifurcation River-Side *River Mile 216.0* *(Mile 33.7)*	Mendota Dam *River Mile 204.7* *(Mile 38.0)*	Sack Dam *River Mile 182.0* *(Mile 50.0)*	Below Merced nr. Newman (NEW) [1] *River Mile 117*	Vernalis[1] *(VNS)*	Jones Pumping Plant[1] *(TRP)*	Clifton Court[1] *(CLC)*
1	553	220	188	143	0	198	0	704	1745	3792	991
2	701	237	194	150	0	201	0	678	1616	3463	992
3	703	213	224	199	0	199	0	615	1578	3463	992
4	699	417	345	262	0	198	0	604	1523	3484	992
5	695	476	415	345	0	196	0	589	1459	3479	996
6	698	510	455	398	0	197	0	543	1427	3469	997
7	698	536	495	425	0	199	0	509	1392	3464	994
8	693	543	529	449	0	191	0	483	1340	3455	995
9	703	540	577	462	0	194	0	469	1320	3446	1176
10	710	536	585	466	123	205	0	457	1296	3443	966
11	499	549	603	493	185	222	0	458	1278	3443	916
12	348	526	612	518	203	233	0	451	1279	3441	991
13	346	365	453	442	225	247	0	448	1310	3447	990
14	346	257	322	312	173	284	0	451	1297	3445	995
15	351	220	266	252	114	297	4	457	1299	3444	993
16	357	198	240	224	87	313	15	472	1310	3046	994
17	354	200	226	210	67	311	23	502	1304	2884	989
18	352	198	226	208	60	304	20	510	1306	2887	995
19	351	198	228	210	64	304	14	503	1311	2242	997
20	346	196	224	208	56	301	16	492	1305	1988	992
21	216	205	232	219	56	292	13	492	1302	1986	996
22	121	180	232	224	57	277	13	495	1303	1982	993
23	120	126	186	195	57	265	9	496	1307	1976	995
24	120	86	116	116	31	254	2	492	1305	1973	1973
25	120	74	80	82	10	292	0	496	1290	1969	3990
26	120	67	64	68	0	732	0	489	1280	1971	3494
27	119	63	53	56	0	659	0	485	1268	1978	2985
28	119	63	44	35	0	291	0	505	1284	1987	2993
29	119	63	41	25	0	149	0	497	1338	1978	3492
30	119	62	39	22	0	88	0	493	1351	1977	3498
Total CFS	11,796	8,124	8,494	7,418	1,568	8,093	129	Available with final flow record.	Available with final flow record.		
Mean CFS	393	271	283	247	52	270	4				
Total AF	23,397	16,114	16,848	14,714	3,110	16,052	256				
Max. CFS	710	549	612	518	225	732	23				
Min. CFS	119	62	39	22	0	88	0				
	Peak CFS	556	624	522	243						
	Date / Time	11 / 1600	12 / 1230	12 / 1130	13 / 0800						

1. Provisional data from CDEC. Flow record from USGS was not available at the time of this report.

SAN JOAQUIN RIVER OPERATIONS

December
2009

Date	Friant Dam Release	Donny Bridge *River Mile 240.9* *(Mile 1.0)*	Skaggs Bridge *River Mile 232.1* *(Mile 6.5)*	Gravelly Ford *River Mile 227.6* *(Mile 24.5)*	Bifurcation River-Side *River Mile 216.0* *(Mile 33.7)*	Mendota Dam *River Mile 204.7* *(Mile 38.0)*	Sack Dam *River Mile 182.0* *(Mile 50.0)*	Below Merced nr. Newman (NEW)[1] *River Mile 117*	Vernalis[1] *(VNS)*	Jones Pumping Plant[1] *(TRP)*	Clifton Court[1] *(CLC)*
1	119	0	0	63	38	18	0	514	1275	1981	3493
2	119	0	0	60	36	15	0	574	1231	1987	2947
3	119	0	0	59	33	10	0	574	1257	1989	2000
4	121	0	0	57	32	13	0	541	1272	1985	1991
5	122	0	0	58	32	2	0	515	1267	1988	1988
6	122	0	0	59	33	2	0	496	1260	1988	1999
7	122	0	0	61	34	3	0	488	1270	1982	1997
8	122	0	0	63	35	3	0	492	1312	1973	1996
9	122	0	0	61	37	4	0	487	1270	1965	1928
10	121	0	0	59	35	3	0	461	1244	1965	1962
11	122	0	0	66	36	1	0	465	1267	1970	2444
12	122	0	0	81	61	13	0	497	1314	1976	2481
13	122	0	0	86	87	40	0	548	1386	1985	2893
14	122	0	0	78	79	45	0	614	1395	1979	3997
15	122	0	0	70	57	31	0	672	1394	1952	4486
16	122	0	0	64	48	21	0	681	1420	2561	4497
17	122	0	0	62	43	18	0	675	1454	2934	4494
18	123	0	0	61	38	9	0	654	1456	2935	4490
19	123	0	0	60	34	3	0	605	1441	2932	4496
20	123	0	0	61	34	3	0	572	1404	2928	4485
21	123	0	0	61	35	6	0	545	1376	2925	3996
22	123	0	0	65	36	9	0	535	1347	2931	3490
23	123	0	0	64	41	16	0	518	1325	2840	3511
24	123	0	0	59	40	21	0	485	1305	2242	4488
25	123	0	0	59	34	11	0	476	1280	1980	3989
26	124	0	0	61	34	7	0	482	1258	1989	3989
27	124	0	0	61	35	10	0	472	1268	1990	3997
28	124	0	0	61	35	10	0	458	1278	1991	3994
29	124	0	0	61	33	12	0	454	1269	1993	3498
30	124	0	0	61	35	14	0	459	1258	1290	3475
31	124						0	453	1244	1007	2997
Total CFS	124	0	0	60	35	14	0	Available with final flow record.	Available with final flow record.		
Mean CFS	122	0	0	63	41	12	0				
Total AF	246	0	0	119	69	28	0				
Max. CFS	124	0	0	86	87	45	0				
Min. CFS	119	0	0	57	32	1	0				
	Peak CFS										
	Date / Time										

1. Provisional data from CDEC. Flow record from USGS was not available at the time of this report.

SAN JOAQUIN RIVER OPERATIONS

January
2010

Date	Friant Dam Release	Cottonwood Creek *River Mile 265* *(Mile 1)*	Little Dry Creek *River Mile 261* *(Mile 5)*	Donny Bridge *River Mile 255* *(Mile 11)*	Skaggs Bridge *River Mile 243* *(Mile 23)*	Gravelly Ford *River Mile 229* *(Mile37)*	Bifurcation River-Side *River Mile 216* *(Mile50)*	Mendota Dam[1] *River Mile 204.7* *(Mile 38.0)*	Sack Dam *River Mile 182* *(Mile84)*	Washington Road *River Mile 168* *(Mile 98)*	Below Merced nr. Newman (NEW)[1] *River Mile 117*	Vernalis[1] *(VNS)*	Jones Pumping Plant[1] *(TRP)*	Clifton Court[1] *(CLC)*
1	124	0	0	59	34	11	0	--	0		451	1238	1009	2994
2	124	0	0	59	32	8	0	--	0		448	1231	1008	2987
3	124	0	0	57	32	6	0	--	0		444	1229	1008	2990
4	124	0	0	57	32	5	0	--	0		433	1226	1006	3996
5	124	0	0	57	32	6	0	--	0		435	1208	1004	4495
6	124	0	0	56	31	6	0	--	0		428	1207	1002	4493
7	124	0	0	57	30	5	0	22	0		426	1197	1001	3981
8	124	0	0	57	29	3	0	25	0		432	1181	1000	3975
9	123	0	0	58	30	2	0	30	0		433	1177	1001	3485
10	123	0	0	60	30	0	0	35	0		446	1212	1004	3495
11	123	0	0	61	31	1	0	50	0		435	1260	1002	3486
12	123	0	0	61	32	2	0	65	0		439	1259	1005	3496
13	123	0	0	63	35	4	0	58	0		449	1275	1009	3995
14	122	0	0	65	34	5	0	60	0		469	1368	1006	4494
15	120	0	0	64	36	7	0	80	0		486	1372	999	4998
16	120	0	0	60	34	4	0	86	0		492	1448	1003	4991
17	120	0	0	60	32	0	0	89	0		511	1466	1007	4980
18	120	0	0	70	38	0	0	77	0		541	1465	1007	4984
19	119	0	0	78	48	11	0	61	0		640	1615	1011	4995
20	117	0	0	80	52	22	0	62	1		1062	2017	1013	4986
21	117	3	9	84	55	25	0	49	2		1484	3141	1595	3492
22	117	10	53	89	61	30	0	32	9		2132	4164	1831	2990
23	118	8	31	89	64	32	0	26	17		2386	4487	1832	2987
24	119	4	11	84	63	30	0	25	8		2592	4494	2453	2998
25	119	4	5	79	55	25	0	24	5		2540	4075	2696	2983
26	119	3	2	74	52	18	0	24	3		2223	3748	2706	4477
27	119	3	1	70	46	16	0	25	1		1753	3385	3180	3992
28	119	3	0	66	41	13	0	28	0		1365	2975	3329	4738
29	117	3	0	64	38	8	0	34	0		1170	2617	3327	5296
30	116	3	0	63	36	9	0	47	0		1047	2246	3327	4984
31	116	2	0	63	36	9	0	80	1		946	2061	3326	3982
Total CFS	3,741	46	112	2,064	1,231	323	0	Available with final flow record.	46		Available with final flow record.	Available with final flow record.		
Mean CFS	121	1	4	67	40	10	0		1					
Total AF	7,420	91	222	4,094	2,442	641	0		92					
Max. CFS	124	10	53	89	64	32	0		17					
Min. CFS	116	0	0	56	29	0	0		0					

1. Mendota Dam data is provisional data from CDEC. Flow record from USGS was not available at the time of this report.

SAN JOAQUIN RIVER OPERATIONS

February
2010

Date	Friant Dam Release	Cottonwood Creek River Mile 265 *(Mile 1)*	Little Dry Creek River Mile 261 *(Mile 5)*	Donny Bridge River Mile 255 *(Mile 11)*	Skaggs Bridge River Mile 243 *(Mile 23)*	Gravelly Ford River Mile 229 *(Mile37)*	Bifurcation River-Side River Mile 216 *(Mile50)*	Mendota Dam[1] River Mile 204.7 *(Mile 38.0)*	Sack Dam River Mile 182 *(Mile84)*	Washington Road River Mile 168 *(Mile 98)*	Below Merced nr. Newman (NEW)[1] River Mile 117	Vernalis[1] *(VNS)*	Jones Pumping Plant[1] *(TRP)*	Clifton Court[1] *(CLC)*
1	253	2	0	63	36	9	0	97	4		881	1921	3313	3990
2	350	1	0	72	35	7	0	106	6		855	1840	3432	3965
3	350	1	0	150	72	27	0	117	8		790	1867	3505	3963
4	350	1	0	187	156	98	0	121	10		738	1911	3484	3998
5	351	3	0	209	184	143	0	120	11		714	1941	3449	2998
6	351	4	0	228	202	160	0	117	11		709	1986	3993	2992
7	351	11	0	257	226	177	0	146	9		733	2005	4109	2992
8	352	7	4	266	242	192	0	197	7		850	2052	4125	2989
9	352	7	2	271	248	190	0	246	5		991	2694	4209	2986
10	353	9	8	273	250	195	0	255	3		1004	2797	4164	2991
11	376	6	5	271	246	192	0	274	2		1180	2798	3690	2992
12	400	6	2	266	242	188	0	276	2		1272	2823	3470	2498
13	401	6	2	285	246	192	0	276	3		1182	2893	3467	2492
14	401	5	1	295	260	208	0	270	2		1042	2826	3463	2496
15	402	5	0	305	266	217	0	274	0		958	2693	3460	2494
16	402	4	0	300	268	221	0	310	0		916	2578	3462	2494
17	402	4	0	295	264	229	0	374	0		870	2484	3467	2491
18	402	3	0	285	256	233	0	360	3		833	2443	4021	2490
19	403	3	0	290	254	231	0	324	14		778	2440	4212	2997
20	404	3	0	293	254	233	0	305	27		763	2380	4202	2999
21	404	4	0	298	258	237	0	264	37		790	2340	4212	2995
22	404	3	0	305	256	239	31	242	20		814	2442	3808	3499
23	401	3	0	308	256	244	59	229	13		814	2377	3703	3000
24	399	6	42	325	268	254	85	218	17		857	2673	3667	2988
25	402	17	47	341	298	279	95	178	11		975	2998	3709	2999
26	377	13	28	368	308	292	117	156	0		1315	3614	3714	2998
27	351	85	290	395	320	302	135	132	0		1395	3371	3768	2997
28	353	48	110	513	363	322	149	119	0		1784	3729	3691	2994
Total CFS	10,497	270	541	7,714	6,534	5,511	671	Available with final flow record.	224		Available with final flow record.	Available with final flow record.		
Mean CFS	375	10	19	276	233	197	24		8					
Total AF	20,821	536	1,073	15,301	12,960	10,931	1,331		444					
Max. CFS	404	85	290	513	363	322	149		37					
Min. CFS	253	1	0	63	35	7	0		0					

1. Mendota Dam data is provisional data from CDEC. Flow record from USGS was not available at the time of this report.

SAN JOAQUIN RIVER OPERATIONS

March
2010

Date	Friant Dam Release	Cottonwood Creek River Mile 265 (Mile 1)	Little Dry Creek River Mile 261 (Mile 5)	Donny Bridge River Mile 255 (Mile 11)	Skaggs Bridge River Mile 243 (Mile 23)	Gravelly Ford River Mile 229 (Mile37)	Bifurcation River-Side River Mile 216 (Mile50)	Mendota Dam[1] River Mile 204.7 (Mile 38.0)	Sack Dam River Mile 182 (Mile84)	Washington Road River Mile 168 (Mile 98)	Abv Merced nr. Newman (SMN)[1] River Mile 118.4	Vernalis[1] (VNS)	Jones Pumping Plant[1] (TRP)	Clifton Court[1] (CLC)
1	437	35	59	556	468	425	192	167	0			4435	3719	3773
2	499	29	42	491	430	415	241	241	30		1550	4079	4174	3972
3	502	49	59	510	438	415	250	281	90		1582	3978	4131	4198
4	504	119	270	576	473	449	272	296	112		1487	4115	4155	4192
5	506	57	103	740	612	522	297	396	140		1786	4926	4162	4691
6	507	47	79	746	723	644	369	517	229		1868	4697	4148	4688
7	509	39	63	668	663	608	410	559	266		1837	4136	4170	4194
8	500	32	45	617	603	554	385	580	328		1612	3878	4149	4193
9	496	25	33	580	521	514	359	546	339		1378	3534	4158	3876
10	497	22	31	546	488	490	345	534	320		1214	3243	3786	4198
11	498	19	28	523	488	479	327	549	312		1107	2996	3653	3798
12	500	18	24	517	500	496	338	546	318		1041	2801	3669	2496
13	501	55	42	520	529	510	351	536	329		960	2708	2878	1997
14	503	24	31	526	529	500	359	550	323		906	2602	2441	1988
15	500	18	24	526	545	503	361	579	334		912	2523	2661	2478
16	674	15	21	517	537	500	364	609	335		901	2475	2720	2995
17	800	14	19	549	529	479	364	626	313		886	2426	2711	3491
18	801	13	17	658	618	503	375	626	299		935	2398	3251	3498
19	801	12	14	719	678	595	418	631	299		958	2396	3487	3491
20	802	11	12	750	723	685	458	657	363		942	2378	3483	3491
21	803	10	11	757	726	694	483	676	415		933	2523	3488	3497
22	804	9	10	760	735	707	495	698	428		920	2857	3490	3498
23	805	9	9	760	741	712	506	731	436		892	2881	2880	3999
24	807	8	9	757	732	703	509	728	463		871	2685	2717	3997
25	808	8	8	753	729	689	502	736	465		843	2406	2798	3991
26	803	8	7	753	723	685	509	758	461	443	802	2258	2795	3994
27	801	7	7	753	726	685	513	784	460	426	769	2195	2795	3654
28	801	6	5	753	729	689	516	798	479	421	769	2172	2782	3983
29	949	6	4	757	735	689	520	783	498	421	749	2151	2795	3463
30	1096	6	4	794	744	694	534	776	500	426	726	2090	2805	3494
31	1096	7	5	923	813	748	556	786	484	410	702	2006	1983	3998
Total C	20,910	737	1,095	20,355	19,228	17,981	12,478	Available with final flow record.	10,168	2,547	Available with final flow record.	Available with final flow record.		
Mean C	675	24	35	657	620	580	403		328	425				
Total A	41,475	1,462	2,172	40,374	38,139	35,665	24,750		20,168	5,052				
Max. CF	1096	119	270	923	813	748	556		500	443				
Min. CF	437	6	4	491	430	415	192		0	410				

1. Provisional data from CDEC. Flow record from USGS was not available at the time of this report.

SAN JOAQUIN RIVER OPERATIONS

April
2010

Date	Friant Dam Release	Cottonwood Creek *River Mile 265* *(Mile 1)*	Little Dry Creek *River Mile 261* *(Mile 5)*	Donny Bridge *River Mile 255* *(Mile 11)*	Skaggs Bridge *River Mile 243* *(Mile 23)*	Gravelly Ford *River Mile 229* *(Mile37)*	Bifurcation River-Side *River Mile 216* *(Mile50)*	Mendota Dam[1] *River Mile 204.7* *(Mile 38.0)*	Sack Dam *River Mile 182* *(Mile84)*	Washington Road *River Mile 168* *(Mile 98)*	Abv Merced nr. Newman (SMN)[1] *River Mile 118.4*	Vernalis[1] *(VNS)*	Jones Pumping Plant[1] *(TRP)*	Clifton Court[1] *(CLC)*
1	1095	7	7	995	903	829	640	824	518	404	689	1910	796	687
2	1094	5	4	1015	935	869	724	884	584	441	672	2052	807	699
3	1094	4	4	1022	951	915	761	941	668	515	659	2789	826	692
4	1094	4	3	1022	959	924	783	973	720	581	667	3181	826	683
5	1094	38	12	1032	1003	943	809	996	767	635	730	3556	827	654
6	1092	15	17	1049	1011	980	814	1003	798	678	817	3718	823	694
7	1100	8	8	1056	1003	952	805	1005	795	686	852	3803	822	699
8	1105	6	6	1032	979	961	818	1025	812	694	894	3861	823	696
9	1104	4	5	1032	975	957	818	1041	820	717	872	3781	824	697
10	1103	4	4	1022	967	952	805	1035	827	730	844	3723	824	691
11	1102	4	4	1025	983	961	831	1049	817	758	832	3650	822	696
12	1234	18	17	1046	1007	1003	871	1031	823	781	869	3874	649	890
13	1390	21	21	1110	1071	1056	906	1020	807	806	912	3934	618	893
14	1246	10	14	1324	1211	1119	941	1017	782	779	1035	4353	623	898
15	1245	7	9	1280	1295	1224	995	1010	752	733	1137	4468	833	690
16	1243	5	6	1219	1265	1148	1009	994	756	724	1128	4538	826	689
17	1313	4	4	1202	1255	1114	977	944	762	723	1049	4682	827	694
18	1354	4	4	1233	1255	1114	968	949	761	725	964	4827	827	699
19	1275	3	3	1307	1290	1183	995	954	759	742	930	4866	829	724
20	1104	6	5	1311	1305	1241	1065	956	764	770	911	5013	830	657
21	1103	18	25	1199	1300	1247	1093	967	773	782	962	5359	829	698
22	1103	18	36	1127	1247	1137	1074	952	773	772	1063	5378	853	699
23	1248	10	19	1114	1227	1044	990	832	757	748	1345	5383	862	691
24	1352	8	14	1144	1223	1035	950	670	732	707	1614	5377	862	693
25	1348	6	8	1267	1260	1114	968	586	738	687	1753	5595	862	693
26	1344	5	5	1307	1245	1224	1056	652	746	724	1754	5635	862	695
27	1341	4	4	1307	1300	1247	1088	725	728	720	1697	5551	854	692
28	1338	4	4	1304	1300	1253	1093	671	740	699	1633	5378	831	695
29	1345	4	4	1297	1300	1218	1093	829	715	678	1544	5295	831	691
30	1352	4	3	1297	1300	1212	1093	1063	720	613	1299	5081	831	694
Total CFS	36,355	258	279	34,697	34,325	32,176	27,833	Available with final flow record.	22,514	20,752	Available with final flow record.	Available with final flow record.		
Mean CFS	1212	9	9	1157	1144	1073	928		750	692				
Total AF	72,110	512	553	68,821	68,084	63,821	55,207		44,657	41,162				
Max. CFS	1390	38	36	1324	1305	1253	1093		827	806				
Min. CFS	1092	3	3	995	903	829	640		518	404				

1. Provisional data from CDEC. Flow record from USGS was not available at the time of this report.

SAN JOAQUIN RIVER OPERATIONS

May
2010

Date	Friant Dam Release	Cottonwood Creek *River Mile 265* *(Mile 1)*	Little Dry Creek *River Mile 261* *(Mile 5)*	Donny Bridge *River Mile 255* *(Mile 11)*	Skaggs Bridge *River Mile 243* *(Mile 23)*	Gravelly Ford *River Mile 229* *(Mile37)*	Bifurcation River-Side *River Mile 216* *(Mile50)*	Mendota Dam[1] *River Mile 204.7* *(Mile 38.0)*	Sack Dam *River Mile 182* *(Mile84)*	Washington Road *River Mile 168* *(Mile 98)*	Abv Merced nr. Newman *River Mile 118.4*	Vernalis[1] *(VNS)*	Jones Pumping Plant[1] *(TRP)*	Clifton Court[1] *(CLC)*
1	1475	4	2	1304	1285	1212	1098	1075	773	665	1075	4968	831	694
2	1546	3	2	1355	1305	1241	1107	1045	764	710	959	5000	832	693
3	1541	3	1	1456	1355	1357	1146	1071	734	677	929	4973	829	691
4	1536	2	1	1484	1390	1462	1240	1115	741	682	953	4736	827	691
5	1541	2	8	1474	1380	1481	1282	1146	737	703	1046	5156	825	709
6	1552	2	12	1463	1365	1468	1271	1139	715	720	1175	5537	823	687
7	1551	1	12	1481	1380	1443	1255	1123	665	680	1161	5655	822	693
8	1549	1	12	1484	1415	1456	1255	1096	662	646	1134	5651	823	699
9	1543	1	12	1477	1415	1462	1260	1062	654	641	1138	5760	824	695
10	1538	1	12	1474	1415	1450	1250	959	549	568	1051	5933	826	693
11	1542	1	12	1467	1420	1437	1245	816	402	427	921	5813	820	681
12	1553	2	14	1470	1415	1412	1220	731	300	298	816	5619	823	692
13	1546	2	18	1463	1415	1419	1215	771	268	213	723	5430	825	693
14	1540	1	17	1449	1380	1381	1200	791	323	184	640	5055	826	693
15	1534	0	15	1439	1325	1350	1171	784	344	196	626	4697	1462	-2
16	1541	0	15	1435	1380	1357	1156	769	351	211	672	4698	1468	-11
17	1546	0	15	1435	1420	1375	1171	738	337	206	710	4539	826	690
18	1539	0	14	1456	1410	1344	1156	667	324	208	760	4264	825	694
19	1532	0	12	1453	1415	1350	1171	660	307	206	781	4183	823	495
20	1554	0	11	1442	1400	1350	1151	691	301	210	795	4193	1488	21
21	1558	0	8	1442	1390	1332	1176	704	303	212	759	4253	1512	29
22	1550	0	2	1449	1400	1344	1181	697	317	219	755	4226	860	693
23	1546	0	1	1446	1395	1344	1200	672	347	253	748	4610	858	649
24	1554	0	0	1439	1390	1338	1205	734	366	275	656	5068	859	683
25	1558	0	0	1439	1390	1319	1210	934	472	315	683	4923	860	677
26	1550	0	0	1446	1395	1319	1215	1099	602	439	672	4741	867	1996
27	1541	0	0	1453	1405	1319	1230	1080	635	521	714	4723	2825	1994
28	1121	0	0	1439	1390	1319	1235	1041	628	538	797	4583	2829	2992
29	798	0	0	1304	1340	1276	1230	1040	631	554	851	4348	2824	3487
30	795	0	0	971	1071	993	1103	1068	646	558	900	4161	2837	3467
31	791	0	0	818	887	779	804	1055	654	550	924	4068	2829	3497
Total CFS	45,161	26	228	43,607	42,138	41,489	36,809	Available with final flow record.	15,852	13,485	Available with final flow record.	Available with final flow record.		
Mean CFS	1457	1	7	1407	1359	1338	1187		511	435				
Total AF	89,577	52	452	86,494	83,581	82,293	73,011		31,442	26,747				
Max. CFS	1558	4	18	1484	1420	1481	1282		773	720				
Min. CFS	791	0	0	818	887	779	804		268	184				

1. Provisional data from CDEC. Flow record from USGS was not available at the time of this report.

SAN JOAQUIN RIVER OPERATIONS

June
2010

Date	Friant Dam Release	Cottonwood Creek *River Mile 265* *(Mile 1)*	Little Dry Creek *River Mile 261* *(Mile 5)*	Donny Bridge *River Mile 255* *(Mile 11)*	Skaggs Bridge *River Mile 243* *(Mile 23)*	Gravelly Ford *River Mile 229* *(Mile37)*	Bifurcation River-Side *River Mile 216* *(Mile50)*	Mendota Dam[1] *River Mile 204.7* *(Mile 38.0)*	Sack Dam *River Mile 182* *(Mile84)*	Washington Road *River Mile 168* *(Mile 98)*	Abv Merced nr. Newman *River Mile 118.4*	Vernalis[1] *(VNS)*	Jones Pumping Plant[1] *(TRP)*	Clifton Court[1] *(CLC)*
1	791	0	0	763	813	680	640	998	639	537	919	3989	2835	3722
2	795	0	0	743	786	640	556	888	568	499	941	3873	2834	3995
3	798	0	0	726	768	626	513	814	464	406	934	3819	3138	3993
4	803	0	0	723	756	613	495	814	433	328	864	3760	3509	3292
5	805	0	0	719	750	608	485	816	434	298	863	4079	3503	3673
6	802	0	0	729	753	613	481	875	441	292	799	4664	3515	3990
7	813	0	0	729	753	613	481	964	468	308	955	4280	3506	3862
8	554	0	0	736	759	608	481	1038	476	306	993	3899	3516	3992
9	348	0	0	672	747	608	481	1093	490	316	976	3712	3519	3975
10	351	0	0	439	537	493	446	1111	492	326	958	3623	3525	3483
11	351	0	0	336	373	358	335	1116	501	338	926	4331	3045	3496
12	350	0	0	293	306	264	255	952	466	338	935	5452	2838	3494
13	351	0	0	278	276	217	192	804	329	265	832	5652	2838	3489
14	353	0	0	271	262	197	161	749	272	187	771	5875	2842	3497
15	352	0	0	262	254	179	135	725	221	154	718	6109	2839	2997
16	351	0	0	257	250	171	124	700	190	122	659	5306	2837	1978
17	351	0	0	253	244	164	114	679	142	99	593	4711	2823	3976
18	351	0	0	250	244	162	103	653	134	80	540	3984	2821	3971
19	352	0	0	246	244	167	100	607	97	71	518	3428	2829	3988
20	353	0	0	248	242	164	97	607	77	50	497	3216	3306	3996
21	354	0	0	250	240	158	92	634	78	45	499	3040	3518	3499
22	354	0	0	250	236	152	87	625	80	48	505	2799	3529	3494
23	351	0	0	246	236	152	84	595	74	48	471	2693	3530	2991
24	349	0	0	244	226	143	81	570	70	46	454	2661	3408	1997
25	351	0	0	241	224	135	76	569	78	42	416	2563	2831	2499
26	351	0	0	239	220	130	73	554	86	48	413	2585	2612	2493
27	352	0	0	244	218	128	72	522	86	51	425	2904	2610	2496
28	353	0	0	246	224	135	69	459	94	51	443	3147	2644	3493
29	355	0	0	244	224	141	66	443	91	53	429	3045	2665	3490
30	352	0	0	241	222	141	63	485	89	53	395	3622	3267	3991
Total CFS	13,897	0	0	12,118	12,387	9,560	7,438	Available with final flow record.	8,160	5,805	Available with final flow record.	Available with final flow record.		
Mean CFS	463	0	0	404	413	319	248		272	194				
Total AF	27,565	0	0	24,036	24,570	18,962	14,753		16,185	11,514				
Max. CFS	813	0	0	763	813	680	640		639	537				
Min. CFS	348	0	0	239	218	128	63		70	42				

1. Provisional data from CDEC. Flow record from USGS was not available at the time of this report.

SAN JOAQUIN RIVER OPERATIONS

July
2010

Date	Friant Dam Release	Cottonwood Creek *River Mile 265* *(Mile 1)*	Little Dry Creek *River Mile 261* *(Mile 5)*	Donny Bridge *River Mile 255* *(Mile 11)*	Skaggs Bridge *River Mile 243* *(Mile 23)*	Gravelly Ford *River Mile 229* *(Mile37)*	Bifurcation River-Side *River Mile 216* *(Mile50)*	Mendota Dam[1] *River Mile 204.7* *(Mile 38.0)*	Sack Dam *River Mile 182* *(Mile84)*	Washington Road *River Mile 168* *(Mile 98)*	Abv Merced nr. Newman *River Mile 118.4*	Vernalis[1] *(VNS)*	Jones Pumping Plant[1] *(TRP)*	Clifton Court[1] *(CLC)*
1	351	0	0	233	212	133	62	532	82	49	385	3918	4039	4993
2	350	0	0	230	212	135	66	571	80	43	384	3797	4252	5995
3	351	0	0	226	212	154	69	581	83	40	374	3510	4176	6680
4	351	0	0	226	210	150	73	627	84	42	365	3325	4159	6070
5	351	0	0	230	208	152	76	685	93	46	362	3015	4178	6674
6	351	0	0	235	212	162	79	693	92	51	361	2613	4159	5991
7	351	0	0	230	214	171	78	699	89	50	391	2291	4204	5991
8	351	0	0	226	210	173	75	711	95	50	373	2145	4202	6119
9	351	0	0	224	206	169	75	707	98	54	358	1945	4196	6490
10	351	0	0	220	200	158	75	700	93	56	362	1775	4202	6490
11	351	0	0	224	202	164	75	672	98	53	348	1704	3451	5493
12	351	0	0	226	206	173	75	659	95	58	334	1497	3577	5494
13	351	0	0	230	204	175	75	645	99	60	338	1358	3568	5493
14	350	0	0	226	204	177	73	626	89	61	341	1463	3920	4192
15	350	0	0	224	204	173	75	647	70	50	342	1335	4290	4189
16	349	0	0	220	204	164	72	689	69	34	339	1395	4259	4190
17	349	0	0	218	204	158	67	730	79	31	322	1424	4266	4195
18	348	0	0	218	204	158	64	711	96	35	313	1495	4258	4187
19	359	0	0	216	204	164	60	675	83	46	301	1519	4258	4194
20	348	0	0	213	204	156	59	647	69	42	300	1438	4263	4492
21	351	0	0	218	202	150	59	646	66	32	310	1356	4300	4994
22	352	0	0	216	204	150	57	638	69	30	310	1333	4247	4994
23	350	0	0	220	204	154	55	628	80	29	302	1309	4297	4995
24	350	0	0	222	204	143	52	625	103	28	299	1295	4193	4992
25	350	0	0	222	204	150	51	626	159	28	305	1315	3966	4994
26	349	0	0	220	204	143	48	568	199	30	330	1366	4000	4982
27	349	0	0	220	204	135	46	524	108	34	343	1336	4248	5994
28	347	0	0	220	204	137	45	560	73	33	313	1317	4213	5993
29	347	0	0	222	204	141	43	588	73	29	248	1284	4206	5995
30	346	0	0	218	204	150	43	593	67	26	240	1287	4187	6990
31	349	0	0	218	204	162	43	554	71	24	233	1267	4175	6070
Total CFS	10,855	0	0	6,911	6,378	4,834	1,965	Available with final flow record.	2,804	1,274	Available with final flow record.	Available with final flow record.		
Mean CFS	350	0	0	223	206	156	63		90	41				
Total AF	21,531	0	0	13,708	12,651	9,588	3,898		5,562	2,527				
Max. CFS	359	0	0	235	214	177	79		199	61				
Min. CFS	346	0	0	213	200	133	43		66	24				

1. Provisional data from CDEC. Flow record from USGS was not available at the time of this report.

SAN JOAQUIN RIVER OPERATIONS

August
2010

Date	Friant Dam Release	Cottonwood Creek *River Mile 265* *(Mile 1)*	Little Dry Creek *River Mile 261* *(Mile 5)*	Donny Bridge *River Mile 255* *(Mile 11)*	Skaggs Bridge *River Mile 243* *(Mile 23)*	Gravelly Ford *River Mile 229* *(Mile37)*	Bifurcation River-Side *River Mile 216* *(Mile50)*	Mendota Dam[1] *River Mile 204.7* *(Mile 38.0)*	Sack Dam *River Mile 182* *(Mile84)*	Washington Road *River Mile 168* *(Mile 98)*	Abv Merced nr. Newman *River Mile 118.4*	Vernalis[1] *(VNS)*	Jones Pumping Plant[1] *(TRP)*	Clifton Court[1] *(CLC)*
1	350	0	0	202	202	152	42	535	63	23	228	1272	4183	5194
2	349	0	0	204	204	143	42	579	61	22	245	1331	4179	7172
3	355	0	0	204	204	137	42	634	63	19	278	1182	4192	7175
4	358	0	0	206	206	135	40	669	59	15	282	1123	4194	7172
5	357	0	0	206	206	137	42	664	60	9	277	1142	4186	7172
6	357	0	0	210	210	143	46	643	61	6	268	1155	4165	7173
7	359	0	0	202	202	139	46	626	59	7	243	1207	4179	7170
8	354	0	0	200	200	132	46	607	60	14	238	1206	4177	7177
9	350	0	0	200	200	137	46	559	53	19	255	1214	4165	7179
10	349	0	0	202	202	141	45	523	42	19	259	1160	4135	7118
11	348	0	0	198	198	133	45	533	35	16	249	1075	4175	7169
12	348	0	0	196	196	128	41	549	32	9	247	1070	4192	7115
13	350	0	0	196	196	125	37	523	28	3	231	1070	4175	6782
14	352	0	0	196	196	132	41	491	29	3	230	1093	4120	5993
15	352	0	0	202	202	146	47	503	36	2	251	1074	4152	5753
16	350	0	0	202	202	148	51	469	54	2	263	1070	4075	7170
17	352	0	0	200	200	146	52	461	45	1	284	1100	4161	7170
18	342	0	0	198	198	150	52	533	28	1	269	1099	4059	7171
19	325	0	0	196	196	146	53	604	51	0	257	1074	4138	6921
20	324	0	0	188	188	143	55	611	44	0	235	1145	4101	6498
21	323	0	0	176	176	130	50	576	56	1	233	1139	4102	6490
22	323	0	0	174	174	132	43	544	54	11	233	1136	4083	6797
23	324	0	0	170	170	133	39	504	49	16	227	1179	4048	6965
24	325	0	0	166	166	132	37	500	25	16	216	1083	4096	6988
25	324	0	0	168	168	130	37	493	23	15	216	1039	4170	6500
26	323	0	0	166	166	128	36	441	5	4	211	1025	4136	6200
27	337	0	0	158	158	123	35	401	5	2	209	1048	4134	6194
28	350	0	0	152	152	120	34	378	33	6	217	1052	4135	5601
29	350	0	0	162	162	125	33	376	44	11	238	1197	4093	5677
30	350	0	0	174	174	139	32	391	43	16	275	1314	4058	5692
31	350	0	0	174	174	146	42	399	38	17	317	1369	4099	6512
Total CFS	10,660	0	0	5,848	5,848	4,231	1,329	Available with final flow record.	1,339	306	Available with final flow record.	Available with final flow record.		
Mean CFS	344	0	0	189	189	136	43		43	10				
Total AF	21,144	0	0	11,600	11,600	8,392	2,636		2,655	608				
Max. CFS	359	0	0	210	210	152	55		63	23				
Min. CFS	323	0	0	152	152	120	32		5.3	0				

1. Provisional data from CDEC. Flow record from USGS was not available at the time of this report.

SAN JOAQUIN RIVER OPERATIONS

September
2010

Date	Friant Dam Release	Cottonwood Creek *River Mile 265* *(Mile 1)*	Little Dry Creek *River Mile 261* *(Mile 5)*	Donny Bridge *River Mile 255* *(Mile 11)*	Skaggs Bridge *River Mile 243* *(Mile 23)*	Gravelly Ford *River Mile 229* *(Mile37)*	Bifurcation River-Side *River Mile 216* *(Mile50)*	Mendota Dam[1] *River Mile 204.7* *(Mile 38.0)*	Sack Dam *River Mile 182* *(Mile84)*	Washington Road *River Mile 168* *(Mile 98)*	Abv Merced nr. Newman *River Mile 118.4*	Vernalis[1] *(VNS)*	Jones Pumping Plant[1] *(TRP)*	Clifton Court[1] *(CLC)*
1	349	0	0	213	182	152	46	410	14	17	323	1290	4111	6182
2	349	0	0	211	184	152	48	378	0	17	299	1313	4103	6697
3	351	0	0	211	186	152	47	351	0	13	287	1336	4114	6695
4	352	0	0	216	190	152	51	330	0	3	286	1226	4108	6699
5	352	0	0	218	188	150	53	316	0	1	280	1252	4103	6705
6	352	0	0	220	192	148	55	293	0	0	277	1378	4104	6690
7	351	0	0	222	192	146	53	262	0	5	274	1275	4104	6992
8	351	0	0	224	198	148	53	243	0	5	295	1283	4105	6993
9	344	0	0	226	200	150	55	263	0	5	399	1359	4096	7177
10	350	0	0	224	202	152	56	302	0	2	622	1434	4131	6832
11	350	0	0	224	204	150	59	290	0	0	516	1747	4102	6905
12	349	0	0	228	204	150	59	262	0	0	631	2111	4115	7177
13	348	0	0	235	214	160	62	276	0	0	695	2473	4092	7179
14	350	0	0	237	216	160	69	300	0	0	699	2517	4091	7171
15	352	0	0	241	224	164	67	338	0	0	470	2573	4078	7167
16	350	0	0	241	224	164	67	357	0	0	340	2330	4064	6494
17	351	0	0	244	222	169	69	333	0	0	333	2152	4077	5993
18	351	0	0	239	220	164	69	299	0	0	330	2056	4088	5997
19	351	0	0	241	222	162	67	280	0	0	324	2032	4076	5991
20	351	0	0	237	222	167	72	266	0	0	319	1962	3664	5493
21	350	0	0	235	220	169	73	255	0	0	290	1842	3686	4988
22	350	0	0	235	214	160	70	250	0	0	255	1713	4178	5498
23	352	0	0	233	212	160	67	277	0	0	248	1612	4066	5108
24	355	0	0	235	216	167	69	300	0	0	237	1604	4088	6012
25	353	0	0	235	216	167	75	333	0	0	227	1586	4067	5790
26	353	0	0	235	218	171	75	351	0	0	222	1605	4135	5993
27	353	0	0	228	218	171	76	360	0	0	215	1656	4102	5996
28	353	0	0	224	212	164	75	338	0	0	218	1602	4138	6474
29	353	0	0	228	208	160	73	319	0	0	214	1560	4137	6493
30	351	0	0	230	208	162	72	315	0	0	211	1523	4143	6496
Total CFS	10,527	0	0	6,870	6,228	4,763	1,902	Available with final flow record.	14	68	Available with final flow record.	Available with final flow record.		
Mean CFS	351	0	0	229	208	159	63		0	2				
Total AF	20,880	0	0	13,627	12,353	9,447	3,773		28	134				
Max. CFS	355	0	0	244	224	171	76		14	17				
Min. CFS	344	0	0	211	182	146	46		0	0				

1. Provisional data from CDEC. Flow record from USGS was not available at the time of this report.

Attachment 4:

WY 2010 Daily Seepage Evaluations

March 9, 2010

Based on preliminary data, flow exceeded 475 cfs in Reach 2A as recorded at the Gravelly Ford gaging station on March 8, 2010. Flow exceeded 475 cfs in Reach 3 as recorded at the Mendota Pool gaging station on March 8, 2010. Based on the available information below, no seepage problems are anticipated and Reclamation will continue with the Interim Flow releases as scheduled. Daily evaluations will continue while flow remains above this evaluation threshold.

As of 8:00 AM, March 10, 2010, Reclamation personnel have reported the following:

1. Flows are below known conveyance thresholds (8,000 cfs in Reach 2A, 1,300 cfs in Reach 2B, and 1,300 cfs in Reach 3) based on preliminary real-time data.

2. Mendota Pool operations calls did not identify groundwater seepage or flow problems.

3. The seepage hotline received no calls that reported the potential for probable or imminent seepage problems.

4. Real-time groundwater in Reach 2B and 3 wells has not risen above identified groundwater level thresholds.

5. Manually monitored groundwater wells do not show groundwater levels above identified thresholds, with the exception of well R2B-1 which shows a depth below ground surface of 5.57 ft (as of 3/4/2010). The buffer zone for this well is 4-6 feet.

6. Known upstream conditions do not indicate likely seepage impacts.

DATA:

- Most recent stage and flow data: http://restoresjr.net/maps/SJRRarea_Map.html

- Real-time Wells: Three wells in Reaches 2B and 3 are real-time and posted on CDEC. Links are available on restoresjr.net under “Interim Flows Information”. http://restoresjr.net/activities/if/index.html

- Weekly Groundwater Report: Manual measurements taken weekly via electronic well sounder of groundwater monitoring wells in Reaches 2A, 2B, 3 and 4 are provided in the Weekly Groundwater Report. http://restoresjr.net/activities/if/index.html

- Well Atlas: Manual measurements for all wells are provided in the well atlas, available on the Interim Flows Information page under “Well Atlas”. http://restoresjr.net/activities/if/index.html

- Bench Evaluation: The most recent evaluation for the decision to increase to the next flow bench is available at: http://restoresjr.net/activities/if/index.html under “Flow Bench Evaluation”.

BACKGROUND:

Condition 9 of Order Water Right 2009-0058-DWR (Order) for the Water Year 2010 Interim Flows Project issued by the State Water Resources Control Board requires Reclamation to conduct a daily evaluation of groundwater levels and flow and stage levels when flows are greater than 475 cubic feet per second (cfs) in Reaches 2A and 3 and post the results of this evaluation to a publicly available website.

March 10, 2010

Conditions are the same as March 9, 2010 with the exception of:

5. Manually monitored groundwater wells do not show groundwater levels above identified thresholds, with the exception of wells R2B-1 and MW-49B. R2B-1 shows a depth below ground surface of 5.58 ft (buffer 4-6 feet). The groundwater in MW-49B was measured at 5.79 feet below ground surface (buffer 4-6 feet).

March 15, 2010

Conditions are the same as March 10, 2010 with the exception of:

Based on preliminary data, flow exceeded 475 cfs in Reach 2A as recorded at the Gravelly Ford gaging station on March 13, 2010.

3. The seepage hotline received two calls, on March 4th regarding R2B-1, and on March 11th regarding an airstrip near river mile 238.5. The R2B-1 site evaluation determined flow releases could continue as planned. The river mile 238.5 site evaluation is currently underway.

March 16, 2010

Conditions are the same as March 15, 2010 with the exception of:

Releases at Friant Dam increase to 800 cfs today.

3. The seepage hotline received two calls, on March 4th regarding R2B-1, and on March 11th regarding an airstrip near river mile 238.5. Both site evaluations determined the planned releases could proceed.

5. Manually monitored groundwater wells do not show groundwater levels above identified thresholds, with the exception of wells R2B-1 and MW-49B. R2B-1 shows a depth below ground surface of 5.58 ft, with groundwater levels stabilizing (buffer 4-6 feet). The groundwater in MW-49B was measured at 5.79 feet below ground surface (buffer 4-6 feet). A site investigation of MW-49B is currently underway, but the current groundwater level is deemed unlikely to affect alfalfa crops in the adjacent field. Planned releases can proceed.

March 17, 2010

Conditions are the same as March 16, 2010 with the exception of:

3. The seepage hotline received three calls, on March 4th regarding R2B-1, on March 11th regarding an airstrip and pomegranate orchard near river mile 238.5, and on March 15th regarding Fort Washington campground. All evaluations determined the planned releases could proceed.

March 18, 2010

Conditions are the same as March 17, 2010.

March 22, 2010

Conditions are the same as March 18, 2010 with the exception of:

5. Manually monitored groundwater wells do not show groundwater levels above identified thresholds, with the exception of wells R2B-1, MW-49B, and MW-55B. R2B-1 shows a depth below ground surface of 5.45 ft, with groundwater levels stabilizing (buffer 4-6 feet). The groundwater in MW-49B was measured at 5.9 feet below ground surface (buffer 4-6 feet). MW-55B was measured at 8.0 feet below ground surface (buffer 6-8 feet).

7. Telemetered ground water well R37 is offline and is being investigated.

March 23, 2010

Conditions are the same as March 22, 2010 with the exception of:

7. Telemetered ground water well R37 was offline but resumed reporting hourly at 2pm today.

March 24, 2010

Conditions are the same as March 23, 2010.

March 25, 2010

Conditions are the same as March 24, 2010 with the exception of:

5. Manually monitored groundwater wells do not show groundwater levels above identified thresholds, with the exception of wells R2B-1, MW-49B, and MW-55B. R2B-1 shows a depth below ground surface of 5.4 ft, with groundwater levels stabilizing (buffer 4-6 feet). The groundwater in MW-49B was measured at 5.3 feet below ground surface (buffer 4-6 feet). MW-55B was measured at 7.1 feet below ground surface (buffer 6-8 feet).

March 26, 2010

Conditions are the same as March 25, 2010.

March 29, 2010

Conditions are the same as March 26, 2010 with the exception of:

Releases at Friant Dam increase to 1100 cfs today.

2. Mendota Pool operations calls identified a potential need to change gate operations at Chowchilla Bifurcation Structure to pass a sand dune through the structure.

3. The seepage hotline received four calls, on March 4th regarding R2B-1, on March 11th regarding an airstrip and pomegranate orchard near river mile 238.5, on March 15th regarding Fort Washington Beach campground, and on March 26th regarding CCID well 144. All evaluations determined the planned releases could proceed.

<u>March 30, 2010</u>

Conditions are the same as March 29, 2010.

<u>March 31, 2010</u>

Conditions are the same as March 30, 2010.

<u>April 1, 2010</u>

Conditions are the same as March 31, 2010.

<u>April 2, 2010</u>

Conditions are the same as April 1, 2010.

<u>April 5, 2010</u>

Conditions are the same as April 2, 2010 with the exception of:

3. The seepage hotline received five calls or emails: on March 4th regarding R2B-1, on March 11th regarding an airstrip and pomegranate orchard near river mile 238.5, on March 15th regarding Fort Washington Beach campground, on March 26th regarding CCID well 144, and on April 3rd regarding drains in Nickel's property in Reach 4B. The April 3rd call is currently undergoing a site evaluation, and the other call evaluations determined planned releases could continue.

5. Manually monitored groundwater wells do not show groundwater levels above identified thresholds, with the exception of wells R2B-1, MW-49B, MW-55B, and MW-47. R2B-1 shows a depth below ground surface of 5.53 ft, with groundwater levels stabilizing (buffer 4-6 feet). The groundwater in MW-49B was measured at 5.15 feet below ground surface (buffer 4-6 feet). MW-55B was measured at 6.96 feet below ground surface (buffer 6-8 feet). MW-47 was measured at 7.97 feet (buffer 6-8 feet).

<u>April 6, 2010</u>

Conditions are the same as April 5, 2010.

April 7, 2010

Conditions are the same as April 6, 2010.

April 8, 2010

Conditions are the same as April 7, 2010.

April 9, 2010

Conditions are the same as April 8, 2010 with the exception of:

3. The seepage hotline received six calls or emails: on March 4th regarding R2B-1, on March 11th regarding an airstrip and pomegranate orchard near river mile 238.5, on March 15th regarding Fort Washington Beach campground, on March 26th regarding CCID well 144, on April 3rd regarding drains in Nickel's property in Reach 4B, and on April 9th again regarding drains in Nickel's property in Reach 4B. All call evaluations determined planned releases could continue.

April 12, 2010

Conditions are the same as April 9, 2010 with the exception of:

Releases at Friant increase to 1500 cfs today.

5. Manually monitored groundwater wells do not show groundwater levels above identified thresholds, with the exception of wells R2B-1, MW-49B, MW-55B, and MW-47. R2B-1 shows a depth below ground surface of 4.22 ft (buffer 4-6 feet). The groundwater in MW-49B was measured at 4.54 feet below ground surface (buffer 4-6 feet). MW-55B was measured at 6.33 feet below ground surface (buffer 6-8 feet). MW-47 was measured at 7.42 feet (buffer 6-8 feet).

April 13, 2010

Conditions are the same as April 12, 2010 with the exception of:

Releases at Friant decrease to 1250 cfs today due to exchangeable demand at Mendota Pool.

April 14, 2010

Conditions are the same as April 13, 2010.

April 15, 2010

Conditions are the same as April 14, 2010

April 16, 2010

Conditions are the same as April 15, 2010 with the exception of:

5. Manually monitored groundwater wells do not show groundwater levels above identified thresholds, with the exception of wells R2B-1, MW-49B, MW-55B, and MW-47. R2B-1 shows a depth below ground surface of 4.61 ft (buffer 4-6 feet). The groundwater in MW-49B was measured at 4.3 feet below ground surface (buffer 4-6 feet). MW-55B was measured at 5.82 feet below ground surface (buffer 6-8 feet). MW-47 was measured at 7.3 feet (buffer 6-8 feet).

April 19, 2010

Conditions have changed from April 16, 2010 as follows:

Release from Friant Dam increased to 1350 cfs on April 17th, and is limited to 1350 cfs due to exchangeable rates at Mendota Pool.

1. Friant Dam releases can be increased to 1600 cfs with partial recapture at Mendota Pool. Release should be reduced by anticipated Cottonwood and Little Dry Creek inflows so as not to exceed 1300 cfs at the Chowchilla Bifurcation Structure.
2. Sack Dam releases should be maintained at 700 cfs due to potential Reach 4 seepage impacts.
3. Mendota Dam can release water to meet the 700 cfs flow target at Sack Dam and limit releases for the SJRRP such that the combined releases for Interim Flows and Arroyo Canal deliveries do not exceed 1300 cfs.

Based on the available information below, no seepage problems are anticipated within these operating criteria and Reclamation will continue with the Interim Flow releases as scheduled.

As of April 19, 2010:

1. Flows rates from provisional real-time data are below known conveyance thresholds (8,000 cfs in Reach 2A, 1,300 cfs in Reach 2B, and 1,300 cfs in Reach 3).
2. Mendota Pool operations calls did not identify any issues.
3. The seepage hotline received six calls or emails: on March 4th regarding R2B-1, on March 11th regarding an airstrip and pomegranate orchard near river mile 238.5, on March 15th regarding Fort Washington Beach campground, on March 26th regarding CCID well 144, on April 3rd regarding drains in Nickel's property in Reach 4B, and on April 9th again regarding drains in Nickel's property in Reach 4B. All call evaluations determined planned releases could continue with the current restrictions in flows over Sack Dam.
4. Real-time provisional groundwater data does not show groundwater depths crossing identified thresholds.
5. Manually monitored groundwater wells do not show unaddressed groundwater depths crossing identified thresholds. CCID maintained shallow groundwater observation wells show high groundwater depths as reported below.
6. Measured losses in Reach 2A from operations estimates show approximately 240 cfs. Changes in flows below Sack Dam appear to be stabilizing based on CDEC stage telemetry.

Seepage hotline call #4 was emailed on March 26, 2010 regarding groundwater levels in CCID monitoring well 144 in reach 4A with reported levels near the top of the buffer zone. A site evaluation was conducted on March 29. This bench evaluation continues prior release rates in this Reach.

Seepage hotline call #5 was emailed on April 3, 2010 regarding water in seep drains around Jim Nickel's property in Reach 4B. The site was evaluated on April 9th and found to have water table elevations beneath the field from 4.3 – 8 feet below ground surface. The proposed buffer zone for alfalfa and tomatoes, the applicable crops in this field, is 4-6 feet below ground surface. Evaluation determined that further increases in San Joaquin River flows through Reach 4A may risk seepage impacts. A reduction in flows in this area would likely complicate the data collection efforts of the SJRRP, but would not reduce the risk of impact. Mr. Nickel called the seepage hotline the morning of April 10th to discuss the site, which was recorded as seepage hotline call #6. A follow-up call by Reclamation on the evening of April 10th discussed the evaluation process. Measurements taken on April 14th in this area are summarized in Tables 2 and 3. Levels appear to be similar to those on April 9th. Planned flow releases can continue.

Monitoring Well 55B, at San Mateo Road on the left bank, is measured at 5.82 feet. This is above the top of the buffer zone. A site investigation and evaluation on March 29th identified a groundwater table sloping down, away from the river to depths of 20 feet bgs. Crops consist of young palm trees near the river and pistachios farther inland. Young trees are unlikely to have extensive root systems and pistachios are salt tolerant. Reclamation staff met with the landowner – Baker Farms – on April 9, 2010 to discuss allowing groundwater levels to potentially rise up to 5 feet below ground surface. The landowner did not identify concerns with the proposed increase, and levels have not reached the agreed-upon 5 feet at this time.

Data

The weekly groundwater report with manual measurements via electronic well sounder and recent flow data is available at: http://restoresjr.net/activities/if/index.html.

Table shows the current and previously predicted rise in groundwater based on estimated changes in river stage and the conceptual model shown in Figure . (See the April 12th Flowbench Evaluation for more information.) Subsequent pages show the rating curves for each of the key wells. (Mussetter Engineering, Inc., 2008. *San Joaquin HEC-RAS Model Documentation.* Technical Memorandum prepared for California Dept. of Water Resources, Fresno, California, June 2). Rating curves were updated April 9, 2010 for MW-55B to include a linear trend rating curve developed from Reclamation's manually measured stage-discharge data that better fits historical groundwater level rise and reduces the conservatism from the model results.

Table 1: Predicted Increases in Groundwater Levels for Key Wells

Well_ID	Site	Buffer Zone (ft bgs)	Screen Depth (ft bgs)	Current Depth Week of April 11th (ft bgs)[1]	Anticipated Depth (ft)
FA-9	Reach 2A – Transect 12 – Left	4-6	12-32	7.76	7.3
MW-47	**Reach 2A – Transect 12 – Right**	**6-8**	**20-40**	**7.30**	**6.7**
MA-4	Reach 2A – Transect 13 – Right	6-8	15-25	10.85	10.1
MW-49B	**Reach 2A – Transect 13 – Left**	**4-6**	**10-20**	**4.30**	**3.6**
MW-54B	Reach 2B – San Mateo Ave. – Right	TBD	TBD	11.35	11.1
MW-55B	**Reach 2B – San Mateo Ave. – Left**	**6-8**	**10-15**	**5.82**	**4.9**
R2B-1[2]	**Reach 2B – Right**	**4-6**	**8-11**	**4.61**	**4.9**
R2B-2[2]	Reach 2B – Right	4-6	17-20	11.87	12.0
R3-1	Reach 3 – Right	4-6	9-24	7.68	6.9
R3-6	Reach 3 – Right	4-6	17-20	7.27	6.6
R3-7	Reach 3 – Right	3-5	17-20	5.72	4.9
MW-84	Reach 4A – Highway 152 – Right	4-6	32-52	28.45	29.45
MW-87B	Reach 4A – Highway 152 – Left	4-6	TBD	Dry (>14)	Dry

[1] Wells in Reaches 2A were measured on Tuesday, April 13th; MW-54B and MW-56B were measured on Wednesday, April 14th; R2B-1, R2B-2, and wells in Reaches 3 and 4A were measured on Thursday, April 15th.

[2] R2B-1 and R2B-2 are both currently higher than their predicted level for the 1500 cfs release from Friant. However, they are more dependent on Mendota Pool stage then San Joaquin River flows. (See Figure 1)

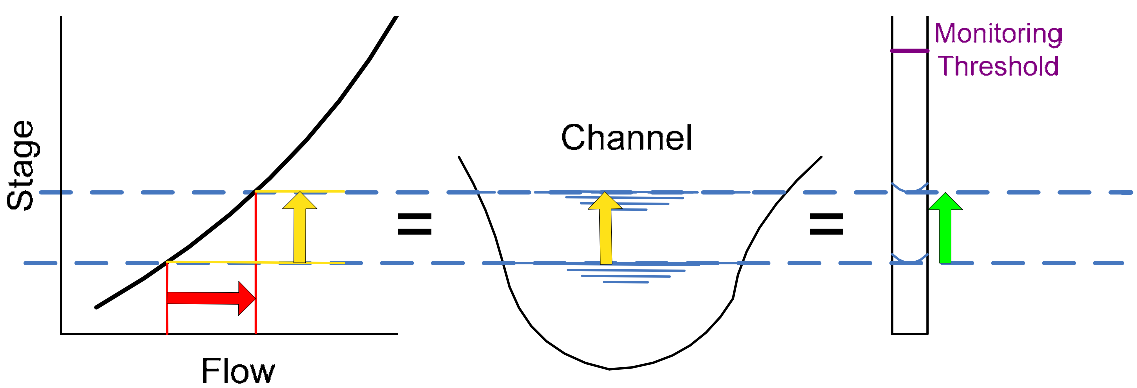


Figure 1: Conceptual Model for Flow Bench Evaluations Estimated Groundwater Depths

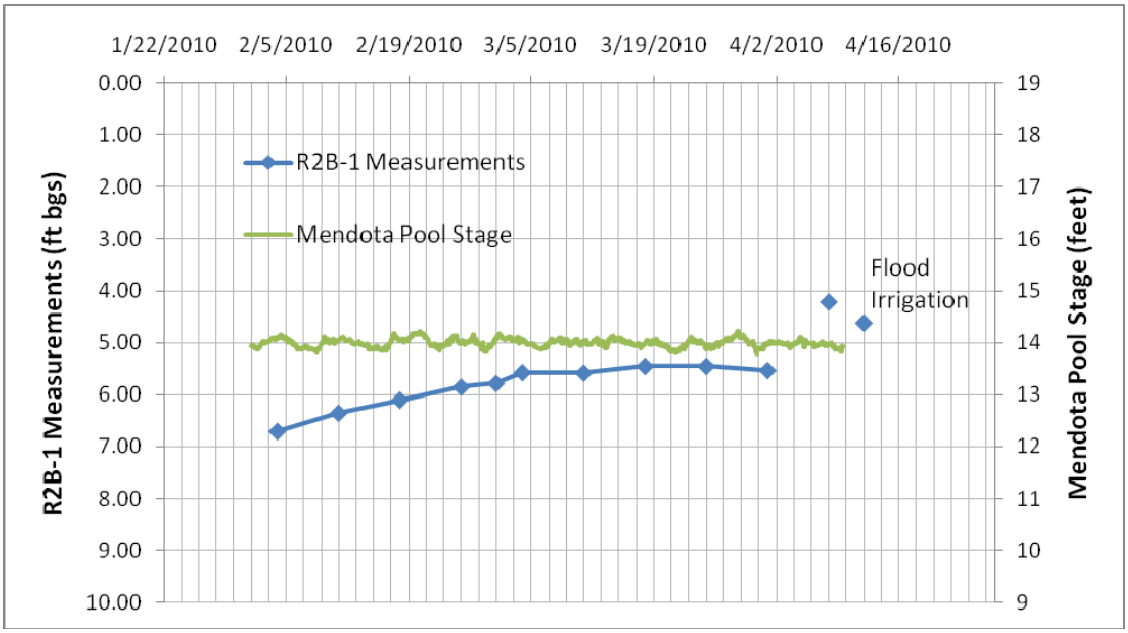


Figure 2 Comparison of Monitoring Well R2B-1 and Mendota Pool Stage

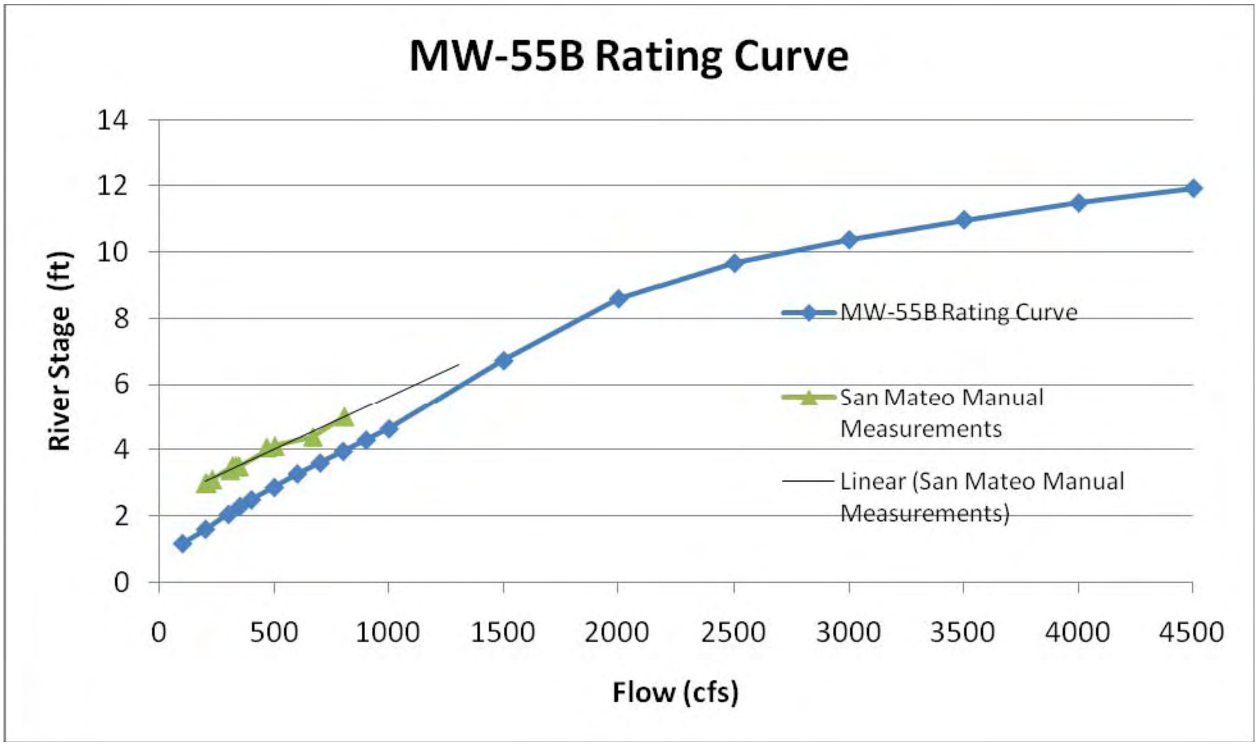
Table 2: Recently Installed Monitoring Well Information

Reach	Well ID	Latitude	Longitude	Site	River Mile
3	MW-10-74	36.93065	-120.465311	Oxalis Ave	187.0
3	MW-10-75	36.929842	-120.469589	Oxalis Ave	187.0
3	MW-10-76	36.927592	-120.485836	Oxalis Ave	187.0
4A	MW-10-91	37.10640300	-120.58951900	San Juan Ranch	168.9
4A	MW-10-92	37.10459700	-120.59168600	San Juan Ranch	168.9
4A	MW-10-93	37.10241900	-120.59401400	San Juan Ranch	168.9

Table 3: Recently Installed Monitoring Well Groundwater Measurements

Well ID	Date	Depth (ft bgs)	Flow (cfs) [1]	Date	Depth (ft bgs)	Flow (cfs) [1]
MW-10-74	3/26/2010	12.7	740	4/14/2010	11.65	1020
MW-10-75	3/26/2010	10.53	740	4/14/2010	8.92	1020
MW-10-76	3/26/2010	7.79	740	4/14/2010	8.02	1020
MW-10-91				4/14/2010	4.44	
MW-10-92				4/14/2010	6.14	
MW-10-93				4/14/2010	6.63	

[1] Flow in the river for River Mile 187.0 is estimated as the same as measured at the Mendota gage one day earlier, located approximately 20 miles upstream. Flow for River Mile 168.9 will be estimated as the flow at the Washington Road gage when a rating curve is developed at that location.



<u>April 20, 2010</u>

Conditions have changed as follows:

Release from Friant Dam is currently limited to 1100 cfs due to exchangeable deliveries and water quality issues at Mendota Pool. Current operations criteria include:

1. Friant Dam releases should be reduced by anticipated Cottonwood and Little Dry Creek inflows so as not to exceed 1300 cfs at the Chowchilla Bifurcation Structure.

2. Sack Dam releases should be maintained at 700 cfs due to potential Reach 4 seepage impacts.

3. Mendota Dam can release water to meet the 700 cfs flow target at Sack Dam and limit releases for the SJRRP such that the combined releases for Interim Flows and Arroyo Canal deliveries do not exceed 1300 cfs.

Based on the available information below, no seepage problems are anticipated within these operating criteria and Reclamation will continue with the Interim Flow releases as scheduled.

As of April 20, 2010:

1. Flows rates from provisional real-time data are below known conveyance thresholds (8,000 cfs in Reach 2A, 1,300 cfs in Reach 2B, and 1,300 cfs in Reach 3).

2. Mendota Pool operations calls did not identify any issues.

3. The seepage hotline received seven calls or emails: on March 4th regarding R2B-1, on March 11th regarding an airstrip and pomegranate orchard near river mile 238.5, on March 15th regarding Fort Washington Beach campground, on March 26th regarding CCID well 144, on April 3rd regarding drains in Nickel's property in Reach 4B, on April 9th again regarding drains in Nickel's property in Reach 4B, and on April 19th regarding a ponded water on a trail at Lost Lake County Park. All call evaluations determined planned releases could continue with the current restrictions in flows over Sack Dam.

4. Real-time provisional groundwater data does not show groundwater depths crossing identified thresholds.

5. Manually monitored groundwater wells do not show unaddressed groundwater depths crossing identified thresholds. CCID maintained shallow groundwater observation wells show high groundwater depths as reported below.

6. Measured losses in Reach 2A from operations estimates show approximately 240 cfs. Changes in flows below Sack Dam appear to be stabilizing based on CDEC stage telemetry.

<u>April 21, 2010</u>

Conditions are the same as April 20, 2010.

<u>April 22, 2010</u>

Conditions are the same as April 21, 2010 with the exception of:

Additional operational criteria:
4. SLDMWA may meet Sack Dam flow targets through the Firebaugh Wasteway to maintain at least 400 cfs of flow in the lower Delta-Mendota Canal. Under conditions when DMC flows fall below 400 cfs, all of the pool demands may be met from SJRRP flows and DMC deliveries to the pool may be zero.

5. Reclamation may request that CCID deliver up to 200 cfs through the Outside Canal from Mendota Pool to Los Banos Creek (Reach 5) if SJRRP inflows exceed the combined demands of Mendota Pool and Sack Dam targets.

Additional hotline call:

4. The seepage hotline received eight calls or emails: on March 4th regarding R2B-1, on March 11th regarding river mile 238.5, on March 15th regarding Fort Washington Beach campground, on March 26th regarding CCID well 144, on April 3rd regarding drains in Reach 4B, on April 9th again regarding drains in Nickel's property in Reach 4B, on April 15th regarding a potential

almond orchard, and on April 19th regarding a ponded water on a trail at Lost Lake County Park. All call evaluations determined planned releases could continue with the current restrictions in flows over Sack Dam.

April 23, 2010

Conditions are the same as April 22, 2010 with the exception of:

Release from Friant Dam will be increased to 1350 cfs at 10am today due to increases in exchangeable deliveries and resolution of the water quality issues at Mendota Pool.

April 26, 2010

Release from Friant Dam was increased to 1350 cfs on Friday, April 23rd due to increases in exchangeable deliveries and resolution of the water quality issues at Mendota Pool.

6. Measured losses in Reach 2A from operations estimates show approximately 200 cfs. Changes in flows below Sack Dam appear to be stabilizing based on CDEC stage telemetry.

April 27, 2010

6.Measured losses in Reach 2A from operations estimates show approximately 140 cfs. Changes in flows below Sack Dam appear to be stabilizing based on CDEC stage telemetry.

April 28, 2010

Conditions are the same as April 27, 2010.

April 29, 2010

Conditions are the same as April 28, 2010.

April 30, 2010

Conditions are the same as April 29, 2010.

May 3, 2010

Conditions are the same as April 30, 2010 with the exception of:

Release from Friant Dam was increased to 1550 cfs on Saturday, May 1st due to increases in exchangeable deliveries and resolution of the water quality issues at Mendota Pool.

3. The seepage hotline received nine calls or emails: on March 4th regarding R2B-1, on March 11th regarding river mile 238.5, on March 15th regarding Fort Washington Beach campground, on March 26th regarding CCID well 144, on April 3rd regarding drains in Reach 4B, on April 9th again regarding

drains in Nickel's property in Reach 4B, on April 15th regarding a potential almond orchard, on April 19th regarding a ponded water on a trail at Lost Lake County Park, and on April 28th regarding ponded areas requiring mosquito treatment. All call evaluations determined planned releases could continue with the current restrictions in flows over Sack Dam.

May 4, 2010

Conditions are the same as May 3, 2010 with the exception of:

3. The seepage hotline received ten calls or emails: on March 4th regarding R2B-1, on March 11th regarding river mile 238.5, on March 15th regarding Fort Washington Beach campground, on March 26th regarding CCID well 144, on April 3rd regarding drains in Reach 4B, on April 9th again regarding drains in Nickel's property in Reach 4B, on April 15th regarding a potential almond orchard, on April 19th regarding a ponded water on a trail at Lost Lake County Park, on April 28th regarding ponded areas requiring mosquito treatment, and on May 3rd regarding land near well R3-7. All call evaluations determined planned releases could continue with the current restrictions in flows over Sack Dam, and an evaluation of the May 3rd call is currently in progress.

6. Measured losses in Reach 2A from operations estimates show approximately 160 cfs.

May 5, 2010

Conditions are the same as May 4, 2010.

May 6, 2010

Conditions are the same as May 5, 2010 with the exception of:

11. The seepage hotline received eleven calls or emails: on March 4th regarding R2B-1, on March 11th regarding river mile 238.5, on March 15th regarding Fort Washington Beach campground, on March 26th regarding CCID well 144, on April 3rd regarding drains in Reach 4B, on April 9th again regarding drains in Nickel's property in Reach 4B, on April 15th regarding a potential almond orchard, on April 19th regarding a ponded water on a trail at Lost Lake County Park, on April 28th regarding ponded areas requiring mosquito treatment, on May 3rd regarding well R3-7, and on May 5th regarding waterlogged property near Sand Slough. The site evaluation in Sand Slough is currently underway, and all other call evaluations determined planned releases could continue with the current restrictions in flows over Sack Dam.

May 7, 2010

Conditions are the same as May 6, 2010.

May 10, 2010

Conditions are the same as May 7, 2010 with the exception of:

The flow target at Sack Dam was decreased to 500 cfs on Sunday, May 9th in order to evaluate groundwater response. The flow target at Sack Dam will decrease to 300 cfs today, Monday, May 10th.

May 11, 2010

Conditions are the same as May 10, 2010 with the exception of:

6.Measured losses in Reach 2A from operations estimates are approximately 120 cfs.

May 12, 2010

Conditions are the same as May 11, 2010.

May 13, 2010

Conditions are the same as May 12, 2010.

May 14, 2010

Conditions are the same as May 13, 2010.

4.Real-time provisional groundwater data does not show groundwater depths crossing identified thresholds, except for Monitoring Well 75 (CDEC Code W75) which is currently offline. A new monitoring well (CDEC Code W89) is now online.

May 17, 2010

Conditions are the same as May 14, 2010 with the exception of:

6.Measured losses in Reach 2A from operations estimates are approximately 150 cfs.

May 18, 2010

Conditions are the same as May 17, 2010 with the exception of:

4.Real-time provisional groundwater data does not show groundwater depths crossing identified thresholds, except for Monitoring Well 75 (CDEC Code W75) which is currently offline.

May 19, 2010

Conditions are the same as May 18, 2010 with the exception of:

3. The seepage hotline received twelve calls or emails: on March 4th regarding R2B-1, on March 11th regarding river mile 238.5, on March 15th regarding Fort Washington Beach campground, on March 26th regarding CCID well 144, on April 3rd regarding drains in Reach 4B, on April 9th again regarding drains in Nickel's property in Reach 4B, on April 15th regarding a potential almond orchard, on April 19th regarding a ponded water on a trail at Lost Lake County Park, on April 28th regarding ponded areas requiring mosquito treatment, on May 3rd regarding well R3-7, on May 5th regarding property near Sand Slough, and on May 17th again regarding well R3-7. All call evaluations determined planned releases could continue.

<u>May 20, 2010</u>

Conditions are the same as May 19, 2010.

<u>May 21, 2010</u>

Conditions are the same as May 20, 2010.

<u>May 24, 2010</u>

Conditions are the same as May 21, 2010.

<u>May 25, 2010</u>

Conditions are the same as May 24, 2010 with the exception of:

The flow target at Sack Dam was increased to 700 cfs on Tuesday, May 25th.

<u>May 26, 2010</u>

Conditions are the same as May 25, 2010.

<u>May 27, 2010</u>

Conditions are the same as May 26, 2010.

<u>May 28, 2010</u>

Conditions are the same as May 27, 2010.

<u>June 1, 2010</u>

Conditions are the same as May 28, 2010 with the exception of:

The release from Friant Dam was decreased to 800 cfs on Friday, May 28th. The flow target at Gravelly Ford is 610 cfs.

<u>June 2, 2010</u>

Conditions are the same as June 1, 2010 with the exception of:

6.Measured losses in Reach 2A from operations estimates have not stabilized.

June 3, 2010

Conditions are the same as June 2, 2010.

June 4, 2010

Conditions are the same as June 3, 2010.

June 7, 2010

Conditions are the same as June 4, 2010.

June 8, 2010

Conditions are the same as June 7, 2010 with the exception of:

The release from Friant Dam was decreased to 350 cfs on Tuesday, June 8th.

June 9, 2010

Conditions are the same as June 8, 2010 with the exception of:

6.Losses in Reach 2A from operations estimates are 90 cfs.

June 10, 2010

Conditions are the same as June 9, 2010.

June 11, 2010

Conditions are the same as June 10, 2010.

Attachment 5:

Seepage Hotline Calls, Evaluations, and Responses

SJRRP Seepage Hotline Intake Form

Responder Name: __*Dave Mooney*____

Date and Time Received: ____*Thursday, March 4, 2010, 8:40 AM*_______________________________

Seepage Report ID Number: ____*1*____

Contact Information

Landowner Name: _ *Mitigation Land Trust; Randy Houk, Columbia Canal Company (called)*___________

Contact Email or Phone: _*Randy Houk: (559) 659-2426 (called hotline)*____________________________

Date and Time Contacted: ____*Thursday, March 4, 2010, 8:40 AM*________________________________

Seepage Location

Address or Parcel: _ *Mitigation Land Trust (MLT)* ____

How best to access site for conducting a site evaluation?______________________________________

_____*Not Reported*____

____

River Mile (if known): _____*207.1*____

Approximate Distance from SJR: __ *On the right bank of the San Joaquin River* _____________________

Proximity to levee toe of most seepage (feet) – or through levee: ______*Not Reported*______________

Description of Seepage (describe what was observed):

☐ Boils or piping ☐ Erosion on levee ☐ Levee close to overtopping ☐ River stage

☐ Visible standing water ☐ Waterlogged field(s) ☒ Monitoring Well Elevations increase

Description (what observations occurred and supporting data is available):

__ *Groundwater has been rising in R2B-1. On 2/25/2010 it was at 5.85 feet, above the bottom of the buffer zone. Two monitoring wells designated PZ-09-R2B-1 (R2B-1) and PZ-09-R23-2 (R2B-2) were installed on the property by Reclamation in the fall of 2009 for the purpose of monitoring shallow groundwater levels as part of the SJRRP Seepage Management Plan. Groundwater levels in both wells are currently being measured on a weekly basis using an electric well sounder. The water level data are being used to inform water management decisions for the SJRRP Interim Flows.* ____

When was this seepage first noticed, and how long has it been going on? ____*Between 2/18 and 2/25 groundwater in R2B-1 rose above the bottom of the buffer layer at 6 feet below ground surface.* _____

____

SJRRP Seepage Hotline Intake Form

Type of Potential Impact (describe the potential impacts of concern):

☒ Crop impacts ☐ Land Access (roads) ☐ Levee or Structure Integrity

Description (extent and magnitude of anticipated impacts including supporting data such as EM probes, crop records, crop type, crop condition etc.): ____

_ *The property is currently being farmed for a grain crop.*____

____

____

Interim Flow Relationship (describe why the impact is a result of the SJRRP flows.)

☐ River Stage ☐ Drainage ☐ Canals ☐ Irrigation ☐ Flood Operations

Description (include recent land-use practices in the area as well as any efforts to reduce or avoid adverse impacts) : ___ *Between 2/18/2010 and 2/25/2010 groundwater in R2B-1 rose above the bottom of the buffer layer at 6 feet below ground surface, before SJRRP flows reached this location. Now however, SJRRP flows have reached this location in the adjacent river and the groundwater is continuing to rise.* ____

____

Has a SJRRP monitoring well been requested? ☒ Yes ☐ No

Has the parcel been identified as at risk? ☐ No ☐ At a Public Meeting
☐ In EIS/R Comments ☒ Personal Communication with SJRRP Staff

Description (insert text): ____*R2B-1 has been discussed with Reclamation, CCC, and RMC personnel. This includes meetings on Wednesday, 2/24 between Randy Houk, CCC Manager, Stephen Lee - USBR and other Reclamation personnel, and Thursday, 2/25 at 9:00 am at the Fresno Reclamation office between Stephen Lee – USBR, Joe Brummer - USBR, Sarge Green - RMC, with Roger Burnett – USBR and Katrina Harrison-USBR on the phone.* ____

Immediacy of Response Needed (identify the timeframe for decision making)

☒ Increase Monitoring ☐ Impacts are imminent ☐ Levees at risk ☐ Adjust Future Flows
☐ Impacts Occurred

Description: _____*Increased frequency of monitoring. Water levels will be monitored closely in these monitoring wells. Water level information will be used in the SJRRP flow bench evaluation.*________

____

Please attach additional comments as necessary.

SJRRP Seepage Site Evaluation Form

Seepage Report ID Number: ______*1* ____

Date and Time of Site Evaluation: __ *March 4, 2010* ____________________________________

Names of personnel attending site evaluation, agencies belonging to and contact info (phone):
Stephen Lee (SCCAO): 559-487-5397

Carlos Hernandez (SCCAO): 559-487-5521

Randy Houk (Manager, CCC): (559) 659-2426

Roy Catania (Paramount Farms): RoyC@paramountfarming.com

Landowner Name, phone, contact info:____

____ *Roy Catania (Paramount Farms): RoyC@paramountfarming.com*___________

Seepage Location

Address or Parcel:__*Monitoring Well R2B-1, Mitigation Land Trust. The subject property is located on the right bank of the San Joaquin River at River Mile 207.1, south of the Columbia-Mowry Pumping Plant.*____

How easy was access? How should it be accessed in the future? ___________________________

__*Went out with landowner.*____

____

____

River Mile (if known): ___*207.1*____

Approximate Distance from SJR: ___ *on the right bank of the San Joaquin River* __________

Proximity to levee toe of most seepage (feet) – or through levee: _*Rising Groundwater Only*___

GPS Coordinates tracing Seepage Boundaries: ____

_________*Not Reported* ____

____

If possible, please attach an aerial map and mark seepage extent on it.

Immediacy of Response Needed (identify the timeframe for decision making)

☐ Levee Failure Risk ☐ Imminent ☐ Adjust Future Flows ☐ Impacts Occurred

Description: _______ *Decisions need to be made before groundwater level reaches the top of the buffer zone or impacts the grain crop.* ____

SJRRP Seepage Site Evaluation Form

Description of Seepage (describe what was observed):

☐ Boils or piping ☐ Erosion on levee ☐ Levee close to overtopping ☐ River stage

☐ Visible standing water ☐ Waterlogged field(s) ☒ Monitoring Well Elevations increase

Description (what observations occurred and what supporting data is available):

__ *The monitoring thresholds (buffer zones) for well R2B-1 and R2B-2 are both 4-6 feet below ground surface. The water level measured at Well R2B-1 on March 4 at 1530 hrs. was 5.57 feet below ground surface (bgs), which is 0.43 feet above the bottom of the buffer zone for this well. Interim flows released from Friant Dam were entering Mendota Pool upstream of the site at the time of the site visit. The water level measured at Well R2B-2 on March 4 at 1600 hrs. was 12.88 feet below ground surface (bgs), which is 6.88 feet below the bottom of the buffer zone for this well.*___________________

Type of Potential Impact (describe the potential impacts of concern):

☒ Crop impacts ☐ Land Access (roads) ☐ Levee or Structure Integrity

Description (extent and magnitude of anticipated impacts including supporting data such as EM probes, crop records, etc.): ____

______ *The property is currently being farmed for a grain crop.*_____________________________

____

____

____

Interim Flow Relationship (describe why the impact is a result of the SJRRP Flows. Include recent land-use practices in the area as well as any efforts to reduce or avoid adverse impacts)

☐ River Stage ☐ Drainage ☐ Canals ☐ Irrigation ☐ Flood Operations

Description:_____ *Between 2/18/2010 and 2/25/2010 groundwater in R2B-1 rose above the bottom of the buffer layer at 6 feet below ground surface, before SJRRP flows reached this location. Now however, SJRRP flows have reached this location in the adjacent river and the groundwater is continuing to rise.* ____

____

Do you recommend a particular response action to reduce or avoid impacts? Explain.

__*SCCAO staff will continue to monitor the MLT wells closely and report the results to SJRRP staff via the weekly groundwater report or via e-mail as appropriate. Stakeholders will be kept informed of monitoring results by weekly postings to the SJRRP website and discussions with the SJRRP landowner liason.*____

SJRRP Seepage Site Evaluation Form

Photo Log

Please include a Photo number or ID, the time (and date, if different from Site Evaluation date) the photo was taken, the location the photo was taken from and a description of the image subject and important points shown in it.

1) _______________*None Taken*____

____

2) ____

____

3) ____

____

4) ____

____

5) ____

____

6) ____

____

7) ____

____

8) ____

____

9) ____

____

10) ____

____

Please attach additional pages as needed to describe all photos taken, or to add additional information, comments, records or supporting data to the Site Evaluation.

SJRRP Seepage Response Decision Form

Date and Time of Response: ___*Friday, March 5, 2010, 4:30 PM*___________________________

Address or Parcel: __*Monitoring Well R2B-1, Mitigation Land Trust Parcel*___________________

Seepage Report ID Number: ______*1*____

Relevant Data:

Groundwater Observations: ____

____________ *Two monitoring wells designated PZ-09-R2B-1 (R2B-1) and PZ-09-R23-2 (R2B-2) were installed on the property by Reclamation in the fall of 2009 for the purpose of monitoring shallow groundwater levels as part of the SJRRP Seepage Management Plan. Groundwater levels in both wells are currently being measured on a weekly basis using an electric well sounder. The water level data are being used to inform water management decisions for the SJRRP Interim Flows. The property is currently being farmed for a grain crop.* ____

____

Site Evaluation: ____

_____ *Monitoring thresholds (buffer zones) for the wells are both 4-6 feet below ground surface. The water level measured at Well R2B-1 on March 4 at 1530 hrs. was 5.57 feet below ground surface (bgs), which is 0.43 feet above the bottom of the buffer zone for this well. Interim flows released from Friant Dam were entering Mendota Pool upstream of the site at the time of the site visit. The water level measured at Well R2B-2 on March 4 at 1600 hrs. was 12.88 feet below ground surface (bgs), which is 6.88 feet below the bottom of the buffer zone for this well.* ______________________

____

____

Landowner Input: ____

____

____

Comments:______________________ ____

____

____

____

SJRRP Seepage Response Decision Form

Action:

Adjust Future Flows Responses

☐ Restrictions on Maximum Release ☐ Restrictions on ramping rates and duration

☐ Reduction of Restoration Flow releases at Friant Dam

☐ Slurry Walls ☐ Seepage Berms ☐ Drainage Interceptor Ditches ☐ Tile Drains

Immediate Action

☐ Emergency Measures (sandbagging, riprap, etc)

☐ Reduction of Restoration Flow releases at Friant Dam

☐ Redirection of flows at Chowchilla Bifurcation Structure (reduces impacts in Reach 2B on)

☐ Delivery of flows to Exchange Contractors at Mendota Pool (reduces impacts in Reach 3 on)

☐ Delivery of flows to Exchange Contractors and Refuges at Sack Dam (reduces impacts in Reach 4A and downstream)

☐ Compensation

Comments: ____

______________ *SCCAO staff will continue to monitor the MLT wells closely and report the results to SJRRP staff via the weekly groundwater report or via e-mail as appropriate. Stakeholders will be kept informed of monitoring results by weekly postings to the SJRRP website and discussions with the SJRRP landowner liason.*____

____

____

Follow-Up:

☐ Restrictions on Releases ☐ Study on Structural Improvements

Comments: ____

____

____

____

____

SJRRP Seepage Hotline Intake Form

Responder Name: __Ali Gasdick____

Date and Time Received: __March 11, 2010 at about 4:45 PM_____________________________

Seepage Report ID Number: ____#2____

Contact Information

Landowner Name: _____John Whitmore____

Contact Email or Phone: ___559-312-7335 (any time is good to contact him) _________________

Date and Time Contacted: ___ Same as Date and Time Received __________________________

Seepage Location

Address or Parcel: ____30370 Avenue 6, Madera, CA 93637_______________________________

How best to access site for conducting a site evaluation?__________________________________
Contact landowner. Site is where Road 30 and Avenue 6 dead-end into each other. Can be viewed somewhat from the Fresno side of the river. Halfway between Herndon Bridge and Skaggs Bridge____

____

River Mile (if known): _____Unknown, near 238.5_______________________________________

Approximate Distance from SJR: ____

Proximity to levee toe of most seepage (feet) – or through levee: __________________________

Description of Seepage (describe what was observed):

☐ Boils or piping ☐ Erosion on levee ☐ Levee close to overtopping ☐ River stage

☒ Visible standing water ☐ Waterlogged field(s) ☐ Monitoring Well Elevations increase

Description (what observations occurred and supporting data is available):

Mud and water at the end of the landowner's airstrip. Landowner expressed concerns that water was seeping under the berm that separates the airstrip from the river. Landowner has pomegranates planted in this area.

____

____

When was this seepage first noticed, and how long has it been going on? __Didn't ask.____________

____

SJRRP Seepage Hotline Intake Form

Type of Potential Impact (describe the potential impacts of concern):

☒ Crop impacts ☐ Land Access (roads) ☐ Levee or Structure Integrity

Description (extent and magnitude of anticipated impacts including supporting data such as EM probes, crop records, etc.): ____

____

____

____

Interim Flow Relationship (describe why the impact is a result of the SJRRP flows.)

☒ River Stage ☐ Drainage ☐ Canals ☐ Irrigation ☐ Flood Operations

Description (include recent land-use practices in the area as well as any efforts to reduce or avoid adverse impacts) : ____

____

____

____

Has a SJRRP monitoring well been requested? ☐ Yes ☒ No

Has the parcel been identified as at risk? ☐ No ☐ At a Public Meeting
☐ In EIS/R Comments ☐ Personal Communication with SJRRP Staff

Description (insert text): ____

____

____

____

Immediacy of Response Needed (identify the timeframe for decision making)

☐ Impacts are imminent ☐ Levees at risk ☐ Adjust Future Flows ☐ Impacts Occurred

Description: ____

____

____

Please attach additional comments as necessary.

SJRRP Seepage Site Evaluation Form

Date and Time of Site Evaluation: 3/15/2010 10:00 hrs

Names of personnel attending site evaluation, agencies belonging to and contact info (phone):
S. Lee (BOR)

J. Brummer (consultant)

John Whitmore (landowner)

Landowner Name, phone, contact info: John Whitmore (559) 312-7335

Seepage Location

Address or Parcel: Ave. 6 and Rd. 30, Madera CO, CA

How easy was access? How should it be accessed in the future? Ave. 6 and Rd. 30

River Mile (if known):

Approximate Distance from SJR: 75 ft.

Proximity to levee toe of most seepage (feet) – or through levee:

GPS Coordinates tracing Seepage Boundaries:

#1: 36°49' 46.935'' N Lat 119°59' 31.737'' W Long (Approx. Area= 100' x 40')

#2: 36°49' 45.693'' N Lat 119°59' 34.074'' W Long (Approx. Area= 40' x 25')

If possible, please attach an aerial map and mark seepage extent on it.

Immediacy of Response Needed (identify the timeframe for decision making)

☐ Levee Failure ☐ Imminent ☐ Adjust Future Flows ☐ Impacts Occurred

Description: Two wet spots noted in corner of 40 acre Pomegranate Orchard, possibly associated with seepage from SJR

SJRRP Seepage Site Evaluation Form

Description of Seepage (describe what was observed):

☐ Boils or piping ☐ Erosion on levee ☐ Levee close to overtopping ☐ River stage

☒ Visible standing water ☐ Waterlogged field(s) ☐ Monitoring Well Elevations increase

Description (what observations occurred and what supporting data is available): Observed two wet spots with standing water in a pomegranate orchard (40 acres) next to the SJR. Wet area #1, area approximately 100' long x40' wide in SW corner of field at Latitude: 36°49' 46.935'' N Longitude: 119°59' 31.737'' W. Wet area #2, area approximately 40' long x 25' wide in SE corner of field at Latitude: 36°49' 45.693'' N and Longitude: 119°59' 34.074'' W

Type of Potential Impact (describe the potential impacts of concern):

☒ Crop impacts ☐ Land Access (roads) ☐ Levee or Structure Integrity

Description (extent and magnitude of anticipated impacts including supporting data such as EM probes, crop records, etc.): Dug a hand auger boring near wet area #1 > 0-12''-fine, sandy loam with gravel, 12-36''- fine, sandy loam, 36-38''-cobbles terminated boring. Free water measured in boring at 2.9 ft. below ground surface 3/15/2010 at 10:41 hrs-filled in boring with cuttings

Interim Flow Relationship (describe why the impact is a result of the SJRRP Flows. Include recent land-use practices in the area as well as any efforts to reduce or avoid adverse impacts)

☒ River Stage ☐ Drainage ☐ Canals ☐ Irrigation ☐ Flood Operations

Description: Current river stage is very close to land surface from visual observation. River is separated from pomegranate orchard by levee. Approximate distance from Rt Water Edge to Wet spot in field is 75 ft.

Do you recommend a particular response action to reduce or avoid impacts? Explain.

Install temporary/ emergency drive point piezometers and measure water level weekly

SJRRP Seepage Site Evaluation Form

Photo Log

Please include a Photo number or ID, the time (and date, if different from Site Evaluation date) the photo was taken, the location the photo was taken from and a description of the image subject and important points shown in it.

1) Wet Area #1 Looking East (upstream)- 3/15/2010 9:30 Note: Levee on right separates field from San Joaquin River. (attached)

2) Wet Area #2 Looking West (downstream) 3/15/2010 9:44 Note: Levee on Left separates field from SJR (attached)

3) ____

4) ____

5) ____

6) ____

7) ____

8) ____

9) ____

10) ____

Please attach additional pages as needed to describe all photos taken, or to add additional information, comments, records or supporting data to the Site Evaluation.

SJRRP Seepage Site Evaluation Form

Wet Area #1 Looking East (upstream)- 3/15/2010 9:30

Note: Levee on right separates field from San Joaquin River

2. Wet Area #2 Looking West (downstream) 3/15/2010 9:44

Note: Levee on left separates field from San Joaquin River

Tuesday, March 16, 2010
Seepage Hotline Response to Whitmore Property

This property is in Reach 1A of the San Joaquin River Restoration Project. The subject property is low lying land next to the north side of the river. The crop is about 40 acres of 3 year old pomegranate orchard that is divided in the middle by an airplane runway. Two topographic low spots near the end of the runway were showing damp surface soil. The pomegranate trees are in their 3rd year and look relatively healthy, even down to the lowest end of the field.

While we were there, the renter came out to see what we were doing. The renter is Rob Pershong (sp?) and was pleasant to talk with. Mr. Pershong knew the history of this property and was aware of the shallow water table under the lower part of the fields. The land has been leveled and sloped and has some sand streaks and gravels, cobbles on the surface. Due to the low lying setting of the field (east side of runway), and the potential for flooding, Mr. Pershong said the area has a nematode problem, but he chooses not to treat it with pesticide. (this could impact production)

According to Mr. Pershong, the levees will withstand a flow of 4000 cfs in the river. Above that flow the river breaks across the land near the NE corner and Mr. Pershong left a low spot in the levee near the SW corner of the land for the flood water to return to the river.

We hand augured two holes and installed 1.25” diameter well point and galvanized riser pipe. The well points were driven down using a sledge hammer. One well was installed near the lower end of the field, in the SW corner on the east side of the runway. A second well was installed about 330 ft to the NW, along the edge of the field. The ground surface appears to be about 1.5 ft higher than the first well. The ground water level was measured at each well. The depth to water from NGS at well #1 was 3.4 ft. The depth to ground water at well #2 was 5.3 ft. The surface slope of the field reduces the acreage that is now in (or above) the buffer zone. A careful measurement of ground water elevation and surface elevation (surveys) will be needed to determine just how many acres could be impacted by shallow groundwater.

The hand level was used to check the NGS at the well site #1 and the NGS at the wet spot on the end of rows # 38 and #39. The hand level indicated almost 1 ft lower surface topography at the wet spot.

Well at low end of field: UTM, NAD83 11S 0233121 4080155

Depth	Field Texture	% Clay	% Sand	NOTES
0-42”	FSL	10	60	Few Mottles, Capillary Fringe @ 18”
42	Grvls & Cobble			Stopped by cobbles, few mottles visible

Installed 1.25x36 inch well point + 60 inch solid pipe; 36 inch stick-up; 6.4 ft to wt from top of casing (3.4 ft below NGS) Drove well with hammer.

Well at mid point of field: UTM, NAD83 11S 0233060 4080214

Depth	Field Texture	% Clay	% Sand	Moist Content	NOTES
0-24”	Grvlly FSL	8	60	M	Few mottles, disturbed soil,
24-46	Grvls	4	85	M	few mottles
46-50	SL	7	70	VM	Common mottles, distincted orange
50-62	LS	5	80	Wet	Common mottles, capillary fringe
62-68	CoSand	0	100	Wet	Capillary fringe; stopped by cobbles

Installed 1.25x36 inch well point + 120 inch solid pipe; 42 inch stick-up; 8.8 ft to wt from top of casing (3.3 ft below NGS) Bad coupler between two 60” solid pipes.
Drove well point to 9.5 ft from NGS using hammer.

SJRRP Seepage Response Decision Form

Date and Time of Response: ___3/19/2010____

Address or Parcel: _____Whitmore Property, Ave. 6 and Rd. 30, Madera CO, CA_____________

Seepage Report ID Number: ______2____

Relevant Data:

Groundwater Observations: __Observed two wet spots with standing water in a pomegranate orchard (40 acres) next to the SJR. Wet area #1, area approximately 100' long x40' wide in SW corner of field at Latitude: 36°49' 46.935'' N, Longitude: 119°59' 31.737'' W. Wet area #2, area approximately 40' long x 25' wide in SE corner of field at Latitude: 36°49' 45.693'' N and Longitude: 119°59' 34.074'' W _____________________

____

Site Evaluation: ____Dug a hand auger boring near wet area #1 > 0-12''-fine, sandy loam with gravel, 12-36''- fine, sandy loam, 36-38''-cobbles terminated boring. Free water measured in boring at 2.9 ft. below ground surface 3/15/2010 at 10:41 hrs-filled in boring with cuttings. Current river stage is very close to land surface from visual observation. River is separated from pomegranate orchard by levee. Approximate distance from Rt Water Edge to Wet spot in field is 75 ft.____

Landowner Input: ___The renter is Rob Pershong (sp?). Mr. Pershong knew the history of this property and was aware of the shallow water table under the lower part of the fields. The land has been leveled and sloped and has some sand streaks and gravels, cobbles on the surface. Due to the low lying setting of the field (east side of runway), and the potential for flooding, Mr. Pershong said the area has a nematode problem, but he chooses not to treat it with pesticide. (this could impact production)

According to Mr. Pershong, the levees will withstand a flow of 4000 cfs in the river. Above that flow the river breaks across the land near the NE corner and Mr. Pershong left a low spot in the levee near the SW corner of the land for the flood water to return to the river.

____

Comments:_____________________ ____

____

____

SJRRP Seepage Response Decision Form

Action:

Adjust Future Flows Responses

☐ Restrictions on Maximum Release ☐ Restrictions on ramping rates and duration

☐ Reduction of Restoration Flow releases at Friant Dam

☐ Slurry Walls ☐ Seepage Berms ☐ Drainage Interceptor Ditches ☐ Tile Drains

Immediate Action

☐ Emergency Measures (sandbagging, riprap, etc)

☐ Reduction of Restoration Flow releases at Friant Dam

☐ Redirection of flows at Chowchilla Bifurcation Structure (reduces impacts in Reach 2B on)

☐ Delivery of flows to Exchange Contractors at Mendota Pool (reduces impacts in Reach 3 on)

☐ Delivery of flows to Exchange Contractors and Refuges at Sack Dam (reduces impacts in Reach 4A and downstream)

☐ Compensation

Comments: _______Install temporary/ emergency drive point piezometers and measure water level weekly______ ____

____

____

____

Follow-Up:

☐ Restrictions on Releases ☐ Study on Structural Improvements

Comments: ____

____

____

____

____

SJRRP Seepage Hotline Intake Form

Responder Name: __Ali Gasdick____

Date and Time Received: __March 15, 2010 at about 10:30 AM____________________________

Seepage Report ID Number: ____#3____

Contact Information

Landowner Name: _____Judy Finch____

Contact Email or Phone: ___559-434-9600 (any time is good, leave message if she doesn't answer)

Date and Time Contacted: ___ Same as Date and Time Received __________________________

Seepage Location

Address or Parcel: ____10705 North Lanes Road, Fresno, CA_______________________________

How best to access site for conducting a site evaluation?_____ Contact landowner____________

____

____

River Mile (if known): _____Near 256.5____

Approximate Distance from SJR: ___Right on SJR____

Proximity to levee toe of most seepage (feet) – or through levee: __________________________

Description of Seepage (describe what was observed):

☐ Boils or piping ☐ Erosion on levee ☐ Levee close to overtopping ☒ River stage

☐ Visible standing water ☐ Waterlogged field(s) ☐ Monitoring Well Elevations increase

Description (what observations occurred and supporting data is available):

Landowner expressed concerns that her campground would be flooded at flows of 1,595 cfs. She noted that at flows of about 1,100 cfs it starts to come over the bank, but larger flows flood it out. I think the area is called Fort Washington beach.

____

____

When was this seepage first noticed, and how long has it been going on? ____No current seepage, just concerns about future seepage at higher flows____

____

SJRRP Seepage Hotline Intake Form

Type of Potential Impact (describe the potential impacts of concern):

☐ Crop impacts ☒ Land Access (roads) ☐ Levee or Structure Integrity

Description (extent and magnitude of anticipated impacts including supporting data such as EM probes, crop records, etc.): ____

_____Concern that seepage would flood out her campground area making it unusable.
____

____

____

Interim Flow Relationship (describe why the impact is a result of the SJRRP flows.)

☒ River Stage ☐ Drainage ☐ Canals ☐ Irrigation ☐ Flood Operations

Description (include recent land-use practices in the area as well as any efforts to reduce or avoid adverse impacts) : ____

____

____

____

Has a SJRRP monitoring well been requested? ☐ Yes ☒ No

Has the parcel been identified as at risk? ☐ No ☐ At a Public Meeting
☐ In EIS/R Comments ☐ Personal Communication with SJRRP Staff

Description (insert text): ____

____

____

Immediacy of Response Needed (identify the timeframe for decision making)

☒ Future Impacts ☐ Impacts are imminent ☐ Levees at risk ☐ Adjust Future Flows
☐ Impacts Occurred

Description: ____

____

Please attach additional comments as necessary.

SJRRP Seepage Response Decision Form

Date and Time of Response: March 16, 2010

Address or Parcel: 10705 North Lanes Road, Fresno, CA near River Mile 256.5 at Fort Washington Beach Campground

Seepage Report ID Number: #3

Relevant Data:

Landowner Input: Landowner Judy Finch expressed concerns that her campground would be flooded at flows of 1,595 cfs. She noted that at flows of about 1,100 cfs it starts to come over the bank, but larger flows flood it out.

Comments:

Action:

Adjust Future Flows Responses

☐ Restrictions on Maximum Release ☐ Restrictions on ramping rates and duration

☐ Reduction of Restoration Flow releases at Friant Dam

☐ Slurry Walls ☐ Seepage Berms ☐ Drainage Interceptor Ditches ☐ Tile Drains

Immediate Action

☐ Emergency Measures (sandbagging, riprap, etc)

☐ Reduction of Restoration Flow releases at Friant Dam

☐ Redirection of flows at Chowchilla Bifurcation Structure (reduces impacts in Reach 2B on)

☐ Delivery of flows to Exchange Contractors at Mendota Pool (reduces impacts in Reach 3 on)

☐ Delivery of flows to Exchange Contractors and Refuges at Sack Dam (reduces impacts in Reach 4A and downstream)

☐ Compensation

Comments: This hotline call did not warrant a site investigation at this time as it was expressing concerns at future high flows.

Follow-Up:

☐ Restrictions on Releases ☐ Study on Structural Improvements

Comments: Further contact with the landowner will occur before releasing more than 1100 cfs in flows from Friant Dam, as this was the level at which she expressed concern.

SJRRP Seepage Hotline Intake Form

Responder Name: _____Dave Mooney____

Date and Time Received: ____Friday, 3/26/2010, 12:29 PM_________________________________

Seepage Report ID Number: ______4____

Contact Information

Landowner Name: ___Main Stone Corporation; Caller: Chris White, CCID General Manager_______

Contact Email or Phone: _____ Office: (209) 826-1421 Cell: (209) 761-4114____________________

Date and Time Contacted: ____ Same as Date and Time Received_____________________________

Seepage Location

Address or Parcel: _____CCID Well 144____

How best to access site for conducting a site evaluation?_________________________________

____

____

River Mile (if known): _________178.4____

Approximate Distance from SJR: ______900 feet____

Proximity to levee toe of most seepage (feet) – or through levee: _________________________

Description of Seepage (describe what was observed):

☐ Boils or piping ☐ Erosion on levee ☐ Levee close to overtopping ☐ River stage

☐ Visible standing water ☐ Waterlogged field(s) ☒ Monitoring Well Elevations increase

Description (what observations occurred and supporting data is available):

____

We just checked the W.S. in the river next to this well #144. The river W.S. is at the same elevation as the ws elevation in the well. Obviously any increase in flow will result in an increased river ws and a corresponding reaction in this well. This is of concern since the elevation is already about -4.5, well above the threshold.

____

When was this seepage first noticed, and how long has it been going on? ___________________

____

SJRRP Seepage Hotline Intake Form

Type of Potential Impact (describe the potential impacts of concern):

☒ Crop impacts ☒ Land Access (roads) ☐ Levee or Structure Integrity

Description (extent and magnitude of anticipated impacts including supporting data such as EM probes, crop records, etc.): ____

_______ The crop adjacent to the well is Alfalfa. It hasn't been cut yet. These elevations jeopardize the crop and the ability to harvest because at some point the swather gets stuck.________ _______________

____

____

Interim Flow Relationship (describe why the impact is a result of the SJRRP flows.)

☒ River Stage ☐ Drainage ☐ Canals ☐ Irrigation ☐ Flood Operations

Description (include recent land-use practices in the area as well as any efforts to reduce or avoid adverse impacts) : _____Current Groundwater elevation is at -4.5 feet below ground surface as of 3/17/2010. This is well above the threshold. CCID checked the W.S. in the river next to this well #144. The river W.S. is at the same elevation as the ws elevation in the well. Obviously any increase in flow will result in an increased river ws and a corresponding reaction in this well. ___________________________

____

____

Has a SJRRP monitoring well been requested? ☒ Yes (is a MW) ☐ No

Has the parcel been identified as at risk? ☐ No ☐ At a Public Meeting
☐ In EIS/R Comments ☐ Personal Communication with SJRRP Staff

Description (insert text): ____

____

Immediacy of Response Needed (identify the timeframe for decision making)

☐ Future Impacts ☒ Impacts are imminent ☐ Levees at risk ☐ Adjust Future Flows
☐ Impacts Occurred

Description: ____

____

____

Please attach additional comments as necessary.

Harrison, Katrina E

From: Christopher White [cwhite@ccidwater.org]
Sent: Friday, March 26, 2010 12:29 PM
To: John Relvas; Harrison, Katrina E; Mooney, David M
Cc: Steve Chedester; Cotnlady@Inreach. Com; Randy Houk; Chase Hurley
Subject: RE: SJR Observation Wells

David and Katrina,

We just checked the W.S. in the river next to this well #144. The river W.S. is at the same elevation as the ws elevation in the well.

Obviously any increase in flow will result in an increased river ws and a corresponding reaction in this well. This is of concern since the elevation is already about -4.5, well above the threshold, the crop adjacent to the well is Alfalfa. It hasn't been cut yet .... these elevations jeopardize the crop and the ability to harvest ... at some point the swather gets stuck .

Thanks for your help and patience.

Christopher L. White, PE
General Manager
Central California Irrigation District
Post Office Box 1231
Los Banos, California 93635

(209) 826-1421 Office
(209) 761-4114 Cell

-----Original Message-----
From: John Relvas
Sent: Friday, March 26, 2010 9:27 AM
To: Christopher White; Katrina E Harrison; David M Mooney
Cc: Steve Chedester; Cotnlady@Inreach. Com; Randy Houk; Chase Hurley
Subject: RE: SJR Observation Wells

Here is the data from CCID Observation Well # 144.

John

-----Original Message-----
From: Christopher White
Sent: Thu 3/25/2010 5:14 PM
To: Katrina E Harrison; David M Mooney
Cc: Steve Chedester; Cotnlady@Inreach. Com; Randy Houk; Chase Hurley; John Relvas
Subject: Fwd: SJR Observation Wells

Here are the data for two wells. See John's battery note below. Note these are close to threshold levels... The third well shows significant encroachment above 6' but we want to recheck the field elev in the field ... Will have data to u in morn.

John .. Please send data to this entire distribution list once done.

Thanks all.

Sent from my iPhone

Begin forwarded message:

> From: "John Relvas" <jrelvas@ccidwater.org>
> Date: March 25, 2010 4:35:52 PM PDT
> To: "Christopher White" <cwhite@ccidwater.org>
> Subject: SJR Observation Wells
>

> Chris,
>
>
>
> Attached is the data from the SJR shallow ground water wells, 151 and
> 155. I will complete well 144 tomorrow. We need to take an elevation
> shot to reference the well to natural ground. Also, well
> 155 data ends at the end of Feb. The batteries had become depleted.
>
>
>
> John
>
>

SJRRP Seepage Site Evaluation Form

Date and Time of Site Evaluation: 3/29/2010 13:30 hrs

Names of personnel attending site evaluation, agencies belonging to and contact info (phone):
S. Lee (BOR)

J. Brummer (consultant)

Stanley Cotta (leasee)

Landowner Name, phone, contact info: Unknown

Seepage Location

Address or Parcel: San Joaquin River- Reach 4- Lt. Bank downstream from Sack Dam adjacent to SLCC Riverside Canal

How easy was access? How should it be accessed in the future?

Riverside Canal Rd.

River Mile (if known):

Approximate Distance from SJR:

Proximity to levee toe of most seepage (feet) – or through levee:

GPS Coordinates tracing Seepage Boundaries:

No evidence of seepage on land surface observed.

If possible, please attach an aerial map and mark seepage extent on it.

Immediacy of Response Needed (identify the timeframe for decision making)

☐ Levee Failure ☐ Imminent ☐ Adjust Future Flows ☐ Impacts Occurred

Description:

SJRRP Seepage Site Evaluation Form

Description of Seepage (describe what was observed):

☐ Boils or piping ☐ Erosion on levee ☐ Levee close to overtopping ☐ River stage

☐ Visible standing water ☐ Waterlogged field(s) ☒ Monitoring Well Elevations increase

Description (what observations occurred and what supporting data is available): See Appendix A – Measured water level in CCID well 144A. Water level was 9.68' from top of well casing. Well casing stickup is approx. 3.5-4 ft. above adjacent alfalfa field. Water surface in adjacent canal appeared to be 1-2 ft. above field level.

Type of Potential Impact (describe the potential impacts of concern):

☒ Crop impacts ☐ Land Access (roads) ☐ Levee or Structure Integrity

Description (extent and magnitude of anticipated impacts including supporting data such as EM probes, crop records, etc.): See Appendix A.

Interim Flow Relationship (describe why the impact is a result of the SJRRP Flows. Include recent land-use practices in the area as well as any efforts to reduce or avoid adverse impacts)

☐ River Stage ☐ Drainage ☐ Canals ☐ Irrigation ☐ Flood Operations

Description:

Do you recommend a particular response action to reduce or avoid impacts? Explain.

SJRRP Seepage Site Evaluation Form

Photo Log

Please include a Photo number or ID, the time (and date, if different from Site Evaluation date) the photo was taken, the location the photo was taken from and a description of the image subject and important points shown in it.

1) CCID Well 144A with Field #1 on right and SLCC Canal on left. (3/29/2010 14:25)

2) CCID Well 144A with Field #1 (alfalfa) and Boring #1 site in background (3/29/2010 14:25)

3) Field #2 (alfalfa) and Boring #2 with SLCC Canal on left (3/29/2010 13:37)

4)

5)

6)

7)

8)

9)

10)

Please attach additional pages as needed to describe all photos taken, or to add additional information, comments, records or supporting data to the Site Evaluation.

SJRRP Seepage Site Evaluation Form

Photo #1. CCID Well 144A with Field #1 on right and SLCC Canal on left. (3/29/2010 14:25)

Photo #2. CCID Well 144A with Field #1 (alfalfa) and Boring #1 site in background (3/29/2010 14:25)

Photo #3. Field #2 (alfalfa) and Boring #2 with SLCC Canal on left (3/29/2010 13:37)

APPENDIX A:

Subject: Seepage Hotline Call Response at CCID Well 144A – Stanley Cotta (lease)

Date & Time: 3/29/2010, 1330 hours

Attendees: Stephen Lee (BOR Hydrologist), Joe Brummer (Soil Scientist), Stanley Cotta (leasee)

Location: Left bank of San Joaquin River, Reach 4A, Approx. 2-3 miles downstream of Sack Dam.

Discussion:

We met Mr. Cotta at CCID Well 144A. He showed us three fields where he is concerned about seepage impacts from interim flows in the San Joaquin River. A soil boring was dug in each field using a 4 inch diameter hand auger to a depth of approximately 10 feet or to the depth where free water was encountered in the boring, whichever came first. Soils were logged by Mr. Brummer using USDA protocols. Water levels were measured in the borings and in the CCID Well 144A using an electric well sounding device. Water levels in the soil borings were given approximately 15-25 minutes to stabilize before measurement. Soil Boring and Well Information is summarized in Table 1 and 2.

Table 1. Location of Soil Borings and CCID Monitor Well 144A.

Field or Well ID	Crop	Soil Boring ID	Lat (dms, NAD 83)	Lon (dms, NAD 83)
1	Alfalfa	1	37 00 44.046	120 31 53.729
2	Alfalfa	2	37 01 17.677	120 32 17.272
3	Bare – (Prep for Corn)	3	37 01 58.389	120 32 27.058
CCID Well 144A			37 00 45.500	120 31 53.021

Table 2. Water Level Information.

Soil Boring/ Well ID	Date	Time	Water Level (ft_bgs)
1	3/29/2010	1609	8.64
2	3/29/2010	1456	7.20
3	3/29/2010	1417	Dry (>10)
CCID Well 144A	3/29/2010	1517	6.78

1. Field number 1 is located southwest of CCID Well 144 A which is constructed on the left descending bank of the San Luis Canal Company Riverside canal on the left bank of the San Joaquin River approximately 2 miles downstream of Sack Dam. The water level in CCID Well 144A measured at 1517 hours was 9.68 ft from top of the well casing (6.78 ft below ground surface). The well casing stickup above ground surface at the well is 2.9 ft. The well is constructed on the canal bank and the top of the well casing is approximately 3.5-4 ft above land surface in field #1. Soil boring #1 was dug in Field #1 approximately 160 ft. southwest of CCID Well 144A. Free water was encountered in soil boring #1 at a depth of 8.85 ft bgs at 1545 hours. The water stabilized at a depth of 8.64 ft bgs at 1609 hours. The crop in field #1 is alfalfa and appeared to be in fair to good condition. The water surface in the SLCC canal appeared to be 1 to 2 feet above the surface of field #1. The water surface of the San Joaquin River at the site could not be observed from field #1.

2. Field number 2 is located west of San Luis Canal Company Riverside canal on the left bank of the San Joaquin River approximately 2.7 miles downstream of Sack Dam. Soil boring # 2 was dug approximately 85 ft west of the SLCC canal bank and approximately 250 ft west of the left waters edge (lwe) of the San Joaquin River. Free water was encountered in soil boring #2 at a depth of 7.20 ft bgs at 1456 hours. The water remained stable at this level after approximately 15 minutes. The alfalfa crop at the boring site had a yellow discoloration in an area about 150 ft long x 50 ft wide. The water level in the riverside canal at the time of the investigation appeared to be approximately 2-3 feet above the level of the field.

3. Field number 3 is located west of San Joaquin River levee on the left bank of the San Joaquin River approximately 3.3 miles downstream of Sack Dam. Soil boring # 3 was dug approximately 170 ft northwest of the landside toe of the levee and approximately 300 ft northwest of the lwe for the San Joaquin River. No free water was encountered in the boring and the boring was terminated at a depth of 10 feet below ground surface at 1417 hours. The field was prepared for planting corn at the time of the investigation. Monitor well PZ-09-R4A-6 is planned for construction at this site pending receipt of right of entry documents from the landowner.

Flow in the San Joaquin River is measured at the SJR near Dos Palos Gaging Station located just downstream of Sack Dam. Preliminary flow data indicate a flow of approximately 476 cfs during the time of the site investigation.

Recommendations.

Groundwater levels in the fields observed during the site visit do not pose a threat due to seepage to the existing or planned crops. The water levels observed beneath the fields (7.2 to > 10 ft) are below levels of concern identified in the SJRRP Seepage management plan (Buffer Zone for alfalfa = 4-6 feet). Monitoring of existing wells and San Joaquin River flow data in the area should continue as part of the interim flow bench evaluation. The proposed monitor well in Field 3 will be installed pending receipt of right of entry documents from the landowner.

SJRRP Seepage Response Decision Form

Date and Time of Response: 4/1/2010

Address or Parcel: Seepage Hotline Call Response at CCID Well 144A – Stanley Cotta (leasee), Left bank of San Joaquin River, Reach 4A, Approx. 2-3 miles downstream of Sack Dam.

Seepage Report ID Number: # 4

Relevant Data:

Groundwater Observations:

Table 1. Location of Soil Borings and CCID Monitor Well 144A.

Field or Well ID	Crop	Soil Boring ID	Lat (dms, NAD 83)	Lon (dms, NAD 83)
1	Alfalfa	1	37 00 44.046	120 31 53.729
2	Alfalfa	2	37 01 17.677	120 32 17.272
3	Bare – (Prep for Corn)	3	37 01 58.389	120 32 27.058
CCID Well 144A			37 00 45.500	120 31 53.021

Table 2. Water Level Information.

Soil Boring/ Well ID	Date	Time	Water Level (ft_bgs)
1	3/29/2010	1609	8.64
2	3/29/2010	1456	7.20
3	3/29/2010	1417	Dry (>10)
CCID Well 144A	3/29/2010	1517	6.78

Site Evaluation:

We met Mr. Cotta at CCID Well 144A. He showed us three fields where he is concerned about seepage impacts from interim flows in the San Joaquin River. A soil boring was dug in each field using a 4 inch diameter hand auger to a depth of approximately 10 feet or to the depth where free water was encountered in the boring, whichever came first. Soils were logged by Mr. Brummer using USDA protocols. Water levels were measured in the borings and in the CCID Well 144A using an electric well sounding device. Water levels in the soil borings were given approximately 15-25 minutes to stabilize before measurement. Soil Boring and Well Information is summarized above in Table 1 and 2.

SJRRP Seepage Response Decision Form

The alfalfa crop at the boring site #2 had a yellow discoloration in an area about 150 ft long x 50 ft wide. The water level in the riverside canal at the time of the investigation appeared to be approximately 2-3 feet above the level of the field.

Field #3 was prepared for planting corn at the time of the investigation. Monitor well PZ-09-R4A-6 is planned for construction at this site pending receipt of right of entry documents from the landowner.

Landowner Input:

Comments:

Action:

Adjust Future Flows Responses

☐ Restrictions on Maximum Release ☐ Restrictions on ramping rates and duration

☐ Reduction of Restoration Flow releases at Friant Dam

☐ Slurry Walls ☐ Seepage Berms ☐ Drainage Interceptor Ditches ☐ Tile Drains

Immediate Action

☐ Emergency Measures (sandbagging, riprap, etc)

☐ Reduction of Restoration Flow releases at Friant Dam

☐ Redirection of flows at Chowchilla Bifurcation Structure (reduces impacts in Reach 2B on)

☐ Delivery of flows to Exchange Contractors at Mendota Pool (reduces impacts in Reach 3 on)

☐ Delivery of flows to Exchange Contractors and Refuges at Sack Dam (reduces impacts in Reach 4A and downstream)

☐ Compensation

Comments: Groundwater levels in the fields observed during the site visit do not pose a threat due to seepage to the existing or planned crops. The water levels observed beneath the fields (7.2 to > 10 ft) are below levels of concern identified in the SJRRP Seepage management plan (Buffer Zone for alfalfa = 4-6 feet). Monitoring of existing wells and San Joaquin River flow data in the area should continue as part of the interim flow bench evaluation.

Follow-Up:

☐ Restrictions on Releases ☐ Study on Structural Improvements

Comments: The proposed monitor well in Field 3 will be installed pending receipt of right of entry documents from the landowner.

SJRRP Seepage Hotline Intake Form

Responder Name: _____Ali Gasdick____

Date and Time Received: ____Saturday, 4/03/2010, 9:51 AM______________________________________

Seepage Report ID Number: ______5____

Contact Information

Landowner Name: _____Jim Nickel____

Contact Email or Phone: _____________ jlnickel@nfllc.net____

Date and Time Contacted: ________ Same as Date and Time Received______________________________

Seepage Location

Address or Parcel: _____Nickel property in Reach 4B, approx 37.106403, -120.589519________________

How best to access site for conducting a site evaluation?____

_______Likely Indiana Ave. ____

____

River Mile (if known): ____

Approximate Distance from SJR: ___________________ ____

Proximity to levee toe of most seepage (feet) – or through levee: __________________________

Description of Seepage (describe what was observed):

☐ Boils or piping ☐ Erosion on levee ☐ Levee close to overtopping ☒ River stage

☐ Visible standing water ☐ Waterlogged field(s) ☐ Monitoring Well Elevations increase

Description (what observations occurred and supporting data is available):

____

____Prior to the interim flows in the river, there was no water in this seep drain.___________________

____

____

When was this seepage first noticed, and how long has it been going on? ___________________

____Started recently____

SJRRP Seepage Hotline Intake Form

Type of Potential Impact (describe the potential impacts of concern):

☒ Crop impacts ☒ Land Access (roads) ☐ Levee or Structure Integrity

Description (extent and magnitude of anticipated impacts including supporting data such as EM probes, crop records, etc.): ____

_______ ____

____

____

Interim Flow Relationship (describe why the impact is a result of the SJRRP flows.)

☒ River Stage ☐ Drainage ☐ Canals ☐ Irrigation ☐ Flood Operations

Description (include recent land-use practices in the area as well as any efforts to reduce or avoid adverse impacts) : _____ ____With increased river stage, drains are starting to run. _________________

____

____

Has a SJRRP monitoring well been requested? ☒ Yes ☐ No

Has the parcel been identified as at risk? ☐ No ☐ At a Public Meeting
☐ In EIS/R Comments ☐ Personal Communication with SJRRP Staff

Description: _______This property is near proposed monitoring wells MW-91 – MW-93._____________

____

Immediacy of Response Needed (identify the timeframe for decision making)

☐ Future Impacts ☒ Impacts are imminent ☐ Levees at risk ☐ Adjust Future Flows
☐ Impacts Occurred

Description: ______ ____

____

____

Please attach additional comments as necessary.

SJRRP Seepage Hotline Intake Form

SJRRP Seepage Site Evaluation Form- Nickel (San Juan Ranch)

Date and Time of Site Evaluation: 4/7/2010 0930 hrs.

Names of personnel attending site evaluation, agencies belonging to and contact info (phone):
S. Lee (BOR)

J. Brummer (consultant)

Dan Burns (San Juan Ranching Co) 209-387-4181

Landowner Name, phone, contact info: Jim Nickel 661-978-5372

Seepage Location

Address or Parcel: San Joaquin River-Reach 4B, San Juan Ranch

How easy was access? How should it be accessed in the future?

Indiana Ave.

River Mile (if known): 170

Approximate Distance from SJR:

Proximity to levee toe of most seepage (feet) – or through levee:

GPS Coordinates tracing Seepage Boundaries:

If possible, please attach an aerial map and mark seepage extent on it.

Immediacy of Response Needed (identify the timeframe for decision making)

☐ Levee Failure ☐ Imminent ☐ Adjust Future Flows ☐ Impacts Occurred

Description:

SJRRP Seepage Site Evaluation Form- Nickel (San Juan Ranch)

Description of Seepage (describe what was observed):

☐ Boils or piping ☐ Erosion on levee ☐ Levee close to overtopping ☐ River stage

☐ Visible standing water ☐ Waterlogged field(s) ☐ Monitoring Well Elevations increase

Description (what observations occurred and what supporting data is available): Owner noted standing water in drainage ditch adjacent to SLCC Riverside canal (see Appendix A)

Type of Potential Impact (describe the potential impacts of concern):

☒ Crop impacts ☐ Land Access (roads) ☐ Levee or Structure Integrity

Description (extent and magnitude of anticipated impacts including supporting data such as EM probes, crop records, etc.): Owner concerned about impacts to crop (see Appendix A)

Interim Flow Relationship (describe why the impact is a result of the SJRRP Flows. Include recent land-use practices in the area as well as any efforts to reduce or avoid adverse impacts)

☐ River Stage ☐ Drainage ☐ Canals ☐ Irrigation ☐ Flood Operations

Description:

Do you recommend a particular response action to reduce or avoid impacts? Explain.

see Appendix A

SJRRP Seepage Site Evaluation Form- Nickel (San Juan Ranch)

Photo Log

Please include a Photo number or ID, the time (and date, if different from Site Evaluation date) the photo was taken, the location the photo was taken from and a description of the image subject and important points shown in it.

1) Drain Sump with Soil Boring #1 and field #1 in background looking west (4/7/10)

2) Boring #2 and field #2- SLCC Riverside Canal and SJR on left looking south (4/7/10)

3) Open drain and SLCC Riverside Canal looking north (4/7/10)

4) Open drain with stagnant water and staff gage (4/7/10)

5) Field #3 and boring #3 looking east (4/7/10)

6) ______

7) ______

8) ______

9) ______

10) ______

Please attach additional pages as needed to describe all photos taken, or to add additional information, comments, records or supporting data to the Site Evaluation.

SJRRP Seepage Site Evaluation Form- Nickel (San Juan Ranch)

Photo #1: Drain Sump with Soil Boring #1 and field #1 in background looking west (4/7/10).

Photo #2: Boring #2 and field #2- SLCC Riverside Canal and SJR on left looking south (4/7/10).

Photo #3: Open drain and SLCC Riverside Canal looking north (4/7/10).

Photo #4: Open drain with stagnant water and staff gage (4/7/10).

Photo #5: Field #3 and boring #3 looking east (4/7/10).

APPENDIX A:

Subject: Seepage Hotline Call Response at San Juan Ranch – Nickel Family LLC

Date & Time: 4/7/2010, 0930 hours

Attendees: Stephen Lee (BOR Hydrologist), Joe Brummer (Soil Scientist), Dan Burns (San Juan Ranching Co.)

Location: Left bank of San Joaquin River, Reach 4A, Approx. River Mile 170.

Discussion:

We met Mr. Burns at his office near Dos Palos. He showed us a site on the San Juan Ranch where he is concerned about seepage impacts from interim flows in the San Joaquin River. The site has an open drainage ditch (drain) adjacent to the SLCC Riverside canal on the left bank of the San Joaquin River in Reach 4A near RM 170. He noticed that standing water recently appeared in the bottom of the drain that may be associated with the interim flows in the river. A temporary staff gage was installed in the bottom of the drain to monitor water levels in the drain over time. According to Mr. Burns the drain discharges by gravity flow to Wood Slough, which is located to the west of the site. He also showed us a tile drainage system equipped with a sump and electric pump that has been used in the past to control shallow groundwater during high flow events in the river. The tile drain runs roughly parallel to the Riverside canal and is buried at a depth of 8 feet below the fields. The sump discharges to the Riverside Canal when operating. Three soil borings were dug at the site using a 4 inch diameter hand auger to a depth of approximately 10 feet or to the depth where free water was encountered in the boring, whichever came first. Soils were logged by Mr. Brummer using USDA protocols. Water levels were measured in the borings and several existing monitor wells at the site using an electric well sounding device. The borings were left open and marked with a survey stakes to measure groundwater levels over time. Soil Boring and Well Information is summarized in Table 1 and 2.

Table 1. Location of Soil Borings, Monitor Wells, and Drain Sump.

Field or Well ID	Crop	Soil Boring ID	Lat (dms, NAD 83)	Lon (dms, NAD 83)
1	Bare – (Tomato Beds)	1	37 05 40.858	120 34 44.492
2	Bare – (Tomato Beds)	2	37 05 52.800	120 34 43.987
3	Alfalfa	3	37 05 28.379	120 35 24.716
CCID Well 191	Alfalfa		37 05 07.376	120 34 19.461
Drain Sump	Bare – (Tomato Beds)		37 05 41.051	120 34 40.441
Temp Staff Gage			37 05 55.088	120 34 45.061

Table 2. Water Level and Flow Information.

Soil Boring/ Well ID	Date	Time	Water Level (ft_bgs) or Flow (cfs)
1	4/7/2010	1140	8.07
2	4/7/2010	1223	4.65 (top of bed)
3	4/7/2010	1322	4.32
CCID Well 191	4/7/2010	1101	8.35
Tile Drain Sump	4/7/2010	1112	6.07
Temporary Staff Gage	4/7/2010	1249	2.0 (not flowing)
SJR @ Wash Rd.	4/8/2010	1145	694 cfs

1. Boring number 1 and Field number 1 are located west of the tile drain sump. The field is currently bare and is prepared for planting tomatoes in eight inch beds. The field is equipped with a subsurface drip irrigation system and appeared not to be pre-irrigated. The water level in the drain sump was measured at a depth of 6.07 ft from top of the sump at 1112 hours. Soil boring #1 was dug in Field #1 approximately 300 ft. west of the tile drain sump. Free water was encountered in soil boring #1 at a depth of 8.07 ft bgs at 1140 hours. The boring was left open and marked with a survey stake to measure water levels in the future.

2. Boring number 2 and Field number 2 are located west of San Luis Canal Company Riverside canal on the left bank of the San Joaquin River at approximately River Mile 170. The field is currently bare and is prepared for planting tomatoes in eight inch beds. The field is equipped with a subsurface drip irrigation system and appeared not to be pre-irrigated. Soil boring # 2 was dug approximately 100 ft west of the SLCC canal bank. Free water was encountered in soil boring #2 at a depth of 4.65 ft below the top of the beds at 1223 hours. The farm manager reported that this area has had seepage problems in the past associated with high flows in the river.

3. Boring Number 3 and Field number 3 are located approximately 4000 ft. west of San Joaquin River levee near Wood Slough. The field is planted in alfalfa that was recently flood irrigated and appeared to be in good condition. Soil boring # 3 was dug approximately 180 ft east of Wood Slough. Free water was encountered in soil boring #3 at a depth of 4.32 ft below ground surface at 1322 hours.

4. A temporary staff gage was placed in the bottom of the open drain in order to estimate water level changes over time in the ditch. The water surface in the drain was 2.0 at 1249 hours. The water was stagnant (not flowing) in the drain at the time of installation.

5. Flow in the San Joaquin River is measured at the SJR at Washington Road (SWA) gaging station located just downstream of the site. A flow of 694 cfs was measured at the gage the day after the site visit on 4/9/10 at 1145 hours.

Recommendation.

Continue to monitor flow in the San Joaquin River, water levels in the borings, wells, drain sump and open drain and consider the information as part of the SJRRP flow bench evaluations. Develop and monitor SJRRP wells MW-74, 75 and 76 which were recently installed at the site.

APPENDIX B: Soil Boring Logs

T obs.

San Joaquin River Seepage Management Program

Well or Boring# Nickel 1 Sampler: Brianne Lee Date: 4/7/2010

Location(UTM/NAD83) Landform Basin NRCS Map Unit

Location Notes about 20' from Rd and field lead

Topography N level Vegetation & Conditon tomatoes Beds

Irrigation System Type: Gravity - drip Irrigation Quadrant 1/5

Avg EM Measurements; EM_V ____ EM_H ____ EM Calibration Site: EM_V ____ EM_H ____

Estimated ECe (0-36") ____ Soil Temperature, ^0C (2") ____ (16") ____

PROFILE DESCRIPTION AND LABORATORY DATA

Sample No.	Depth ~~(feet)~~ in	USDA Texture	% Clay	% Sand	Color	Reaction to HCL[1]	Moisture Content[2]	Mottles	pH Paste	ECe dS/m	Sat. %	Notes:
	0-23	L	21	35	DKGR	NR	M	None				Friable
	23-44	LtC	40	25	VDKGR		M					FIRM
	44-58	CL	34	40	Olive Brown		M					FIRM
	58-72	SCL	27	52	Olive Brown		M					seg carbonates, Fri.
	72-115	L	13	40	Ye/BRN		VM sat	Few				V. Faint mottles Fri. sandier with depth contains Lt CL layers

[1] Lime content; HCL reaction 0 none; + slight; ++ moderate +++ strong

[2] Soil moist: nearly dry=nd; slightly moist = sm; moist = m; very moist= vm; wet = w; saturated=S;

Field capacity will be considered very moist. Wet will be considered capillary fringe conditions.

Site Remarks:
Capilary fringe conditions about 80-110"
saturated lense about 110".
Site near T Pole guywire, about 300' w.
from drain sump
water table 8.07 after 20 minutes

EM38 Measurements:

EM_V	EM_H	EM_V	EM_H

Temp obs.

2d
21W

San Joaquin River Seepage Management Program

Well or Boring# Nickel 2 Sampler: Brummer Lee Date: 4/7/2010

Location(UTM/NAD83) Landform Basin NRCS Map Unit

Location Notes 200' from tail of field 15-16 rows in from edge

Topography Nlevel Vegetation & Conditon Tomatoe Beds, not pre irr.

Irrigation System Type: Gravity-drip Irrigation Quadrant 4/5

Avg EM Measurements; EM_V ____ EM_H ____ EM Calibration Site: EM_V ____ EM_H ____

Estimated ECe (0-36") ____ Soil Temperature, ^0C (2") ____ (16") ____

PROFILE DESCRIPTION AND LABORATORY DATA

Sample No.	Depth ~~(feet)~~	USDA Texture	% Clay	% Sand	Color	Reaction to HCL[1]	Moisture Content[2]	Mottles	pH Paste	ECe dS/m	Sat. %	Notes:
	0-8	HL	25	30	DKGR		M	None				Friable
	8-22	L	20	35	BRGR		M					
	22-30	LFL	14	48	BRGR		M					
	30-45	C	45	25	V DKGR		M	Few				orange or gray FIRM
	45-60	CL	29	30	Olive Gray		VM-Sat	Few				segregated Carbonate
												& rust mottles

[1] Lime content; HCL reaction 0 none; + slight; ++ moderate +++ strong

[2] Soil moist: nearly dry=nd; slightly moist = sm; moist = m; very moist= vm; wet = w; saturated=S;

Field capacity will be considered very moist. Wet will be considered capillary fringe conditions.

Site Remarks: Free water at about 50".
Measurements to bottom of Furrow.
Farm manager reports this area is
seepy when river runs.
Lost Jar down hole, plastic. Shattered and
left jar in hole. Wt 3.9 bottom Bed

EM38 Measurements:

EM_V	EM_H	EM_V	EM_H

Temp OBS Well Nickel

San Joaquin River Seepage Management Program

Well or Boring# NICKEL 3 Sampler: Brummer, Lee Date: 4/7/2010

Location(UTM/NAD83) 37°05'28.379N 120°35'24.716W Landform Basin NRCS Map Unit ______

Location Notes Site about 180 from slough wood slough

Topography N level Vegetation & Conditon Good alfalfa, young

Irrigation System Type: Gravity Irrigation Quadrant 2/5

Avg EM Measurements; EM_V ______ EM_H ______ EM Calibration Site: EM_V ______ EM_H ______

Estimated ECe (0-36") ______ Soil Temperature, °C (2") ______ (16") ______

PROFILE DESCRIPTION AND LABORATORY DATA

Sample No.	Depth ~~(feet)~~	USDA Texture	% Clay	% Sand	Color	Reaction to HCL[1]	Moisture Content[2]	Mottles	pH Paste	ECe dS/m	Sat. %	Notes:
	0-18	HCL	28	25	DKGR		VM	None				Friable - FIRM
	18-48	LtCL	28	30	LtGR		M	None				common carbonates
	48-54	CL	30	30	Gray		M	Few				many seg. carbs FIRM
	54-66	L	22	40	OL Gr		VM-W	Few				Contains thin
												CL layers

[1] **Lime content; HCL reaction 0 none; + slight; ++ moderate +++ strong**

[2] Soil moist: **nearly dry=nd; slightly moist = sm; moist = m; very moist= vm; wet = w; saturated=S;**

Field capacity will be considered very moist. Wet will be considered capillary fringe conditions.

Site Remarks: Free water at 60"
WT 4.3' after 15 MIN

EM38 Measurements: EM_V	**EM_H**	**EM_V**	**EM_H**

SJRRP Seepage Response Decision Form

Date and Time of Response: 4/12/2010

Address or Parcel: San Juan Ranch, Jim Nickel's property near River Mile 170 and Indiana Ave.

Seepage Report ID Number: #5

Relevant Data:

Groundwater Observations:

Table 1. Location of Soil Borings, Monitor Wells, and Drain Sump.

Field or Well ID	Crop	Soil Boring ID	Lat (dms, NAD 83)	Lon (dms, NAD 83)
1	Bare – (Tomato Beds)	1	37 05 40.858	120 34 44.492
2	Bare – (Tomato Beds)	2	37 05 52.800	120 34 43.987
3	Alfalfa	3	37 05 28.379	120 35 24.716
CCID Well 191	Alfalfa		37 05 07.376	120 34 19.461
Drain Sump	Bare – (Tomato Beds)		37 05 41.051	120 34 40.441
Temp Staff Gage			37 05 55.088	120 34 45.061

Table 2. Water Level and Flow Information.

Soil Boring/ Well ID	Date	Time	Water Level (ft_bgs) or Flow (cfs)
1	4/7/2010	1140	8.07
2	4/7/2010	1223	4.65 (top of bed)
3	4/7/2010	1322	4.32
CCID Well 191	4/7/2010	1101	8.35
Tile Drain Sump	4/7/2010	1112	6.07
Temporary Staff Gage	4/7/2010	1249	2.0 (not flowing)
SJR @ Wash Rd.	4/8/2010	1145	694 cfs

Site Evaluation: Boring number 1 and Field number 1 are located west of the tile drain sump. The field is currently bare and is prepared for planting tomatoes in eight inch beds. The field is equipped with a subsurface drip irrigation system and appeared not to be pre-irrigated.

Boring number 2 and Field number 2 are located west of San Luis Canal Company Riverside canal on the left bank of the San Joaquin River at approximately River Mile 170. The field is currently bare and is prepared for planting tomatoes in eight inch beds. The field is equipped with a subsurface drip irrigation system and appeared not to be pre-irrigated. The farm manager reported that this area has had seepage problems in the past associated with high flows in the river.

SJRRP Seepage Response Decision Form

Boring Number 3 and Field number 3 are located approximately 4000 ft. west of San Joaquin River levee near Wood Slough. The field is planted in alfalfa that was recently flood irrigated and appeared to be in good condition.

Landowner Input: Owner noted standing water in drainage ditch adjacent to SLCC Riverside canal. According to Mr. Burns (farm manager) the drain discharges by gravity flow to Wood Slough, which is located to the west of the site. He also showed us a tile drainage system equipped with a sump and electric pump that has been used in the past to control shallow groundwater during high flow events in the river.

Comments:

Action:

Adjust Future Flows Responses

☐ Restrictions on Maximum Release ☐ Restrictions on ramping rates and duration

☐ Reduction of Restoration Flow releases at Friant Dam

☐ Slurry Walls ☐ Seepage Berms ☐ Drainage Interceptor Ditches ☐ Tile Drains

Immediate Action

☐ Emergency Measures (sandbagging, riprap, etc)

☐ Reduction of Restoration Flow releases at Friant Dam

☐ Redirection of flows at Chowchilla Bifurcation Structure (reduces impacts in Reach 2B on)

☐ Delivery of flows to Exchange Contractors at Mendota Pool (reduces impacts in Reach 3 on)

☐ Delivery of flows to Exchange Contractors and Refuges at Sack Dam (reduces impacts in Reach 4A and downstream)

☐ Compensation

Comments: Continue to monitor flow in the San Joaquin River, water levels in the borings, wells, drain sump and open drain and consider the information as part of the SJRRP flow bench evaluations.

Follow-Up:

☐ Restrictions on Releases ☐ Study on Structural Improvements

Comments: Develop and monitor SJRRP wells MW-74, 75 and 76 which were recently installed at the site.

SJRRP Seepage Hotline Intake Form

Responder Name: _____Dave Mooney____

Date and Time Received: ____Friday, 4/09/2010, 8:00 AM___________________________________

Seepage Report ID Number: ______6____

Contact Information

Landowner Name: _____Jim Nickel, Renter: Dan Burns at (209) 487 4181 or 209 652 2950_____________

Contact Email or Phone: ____________ jlnickel@nfllc.net, 661 978 5372___________________________

Date and Time Contacted: ________ Friday, 4/09/2010, 10:00 AM________________________________

Seepage Location

Address or Parcel: _____Nickel property in Reach 4B, near Washington Ave._______________________

How best to access site for conducting a site evaluation?____

_______Hudsons Road to Washington Ave. West side of SJR_____________________________________

____

River Mile (if known): ______Near Washington Ave____

Approximate Distance from SJR: ______out to ½ mile from river___________________________________

Proximity to levee toe of most seepage (feet) – or through levee: _________________________

Description of Seepage (describe what was observed):

☐ Boils or piping ☐ Erosion on levee ☐ Levee close to overtopping ☒ River stage

☐ Visible standing water ☐ Waterlogged field(s) ☒ Monitoring Well Elevations increase

Description (what observations occurred and supporting data is available):

____

____Prior to the interim flows in the river, there was no water in this seep drain. There is a high water table up to ½ mile from the river. He's currently monitoring where he picked up seepage. A tile drain is currently operating and should mitigate on the south side. North wells should be indicating. _________

____

____

When was this seepage first noticed, and how long has it been going on? ___________________

____Started recently____

SJRRP Seepage Hotline Intake Form

Type of Potential Impact (describe the potential impacts of concern):

☒ Crop impacts ☒ Land Access (roads) ☐ Levee or Structure Integrity

Description (extent and magnitude of anticipated impacts including supporting data such as EM probes, crop records, etc.): ____

___It's close to crop damages if not already. Request no further increase.__________________________

____

____

Interim Flow Relationship (describe why the impact is a result of the SJRRP flows.)

☒ River Stage ☐ Drainage ☐ Canals ☐ Irrigation ☐ Flood Operations

Description (include recent land-use practices in the area as well as any efforts to reduce or avoid adverse impacts) : _____ ____With increased river stage, drains are starting to run, indicating high groundwater levels. ____

____

Has a SJRRP monitoring well been requested? ☒ Yes ☐ No

Has the parcel been identified as at risk? ☐ No ☐ At a Public Meeting
☐ In EIS/R Comments ☐ Personal Communication with SJRRP Staff

Description: _______This property is near newly installed, but not developed, monitoring wells MW-91 – MW-93.____

Immediacy of Response Needed (identify the timeframe for decision making)

☐ Future Impacts ☒ Impacts are imminent ☐ Levees at risk ☐ Adjust Future Flows
☐ Impacts Occurred

Description: _____Impacts and damage may soon be occurring if they aren't already. This seepage hotline call is regarding the same concerns as Seepage Hotline Call #5. No additional site visit is required, but SJRRP management will follow up. ________________

____

____

Please attach additional comments as necessary.

SJRRP Seepage Response Decision Form

Date and Time of Response: 4/12/2010

Address or Parcel: Nickel property in Reach 4B, near Washington Ave.

Seepage Report ID Number: #6

Relevant Data:

Groundwater Observations: See Site Evaluation Form for Hotline Call #5

Site Evaluation: See Site Evaluation Form for Hotline Call #5

Landowner Input: Prior to the interim flows in the river, there was no water in this seep drain. There is a high water table up to ½ mile from the river. He's currently monitoring where he picked up seepage. A tile drain is currently operating and should mitigate on the south side. North wells should be indicating.

Comments: This seepage hotline call is regarding the same concerns as Seepage Hotline Call #5. No additional site visit is required, but SJRRP management will follow up.

SJRRP Seepage Response Decision Form

Action:

Adjust Future Flows Responses

☐ Restrictions on Maximum Release ☐ Restrictions on ramping rates and duration

☐ Reduction of Restoration Flow releases at Friant Dam

☐ Slurry Walls ☐ Seepage Berms ☐ Drainage Interceptor Ditches ☐ Tile Drains

Immediate Action

☐ Emergency Measures (sandbagging, riprap, etc)

☐ Reduction of Restoration Flow releases at Friant Dam

☐ Redirection of flows at Chowchilla Bifurcation Structure (reduces impacts in Reach 2B on)

☐ Delivery of flows to Exchange Contractors at Mendota Pool (reduces impacts in Reach 3 on)

☐ Delivery of flows to Exchange Contractors and Refuges at Sack Dam (reduces impacts in Reach 4A and downstream)

☐ Compensation

Comments:

Follow-Up:

☐ Restrictions on Releases ☐ Study on Structural Improvements

Comments: This seepage hotline call is regarding the same concerns as Seepage Hotline Call #5. No additional site visit is required, but SJRRP management will follow up with the landowner.

SJRRP Seepage Hotline Intake Form

Responder Name: ___Margaret Gidding____

Date and Time Received: __Received email from Brandon Hill, President, Fresno Audubon on 4/19/10 at 10:20 a.m.; ph 559-978-2369________

Seepage Report ID Number: ______7____

Contact Information

Landowner Name: _Lost Lake County Park Nature Trail, Fresno County, John Thompson, jothompson@co.fresno.ca.us____________________________

Contact Email or Phone: __Manuel Diaz, Lost Lake Supervisor, mdiaz@co.fresno.ca.us_______________

Date and Time Contacted: ______11:00 a.m., Monday 4/19/2010________________________________

Seepage Location

Address or Parcel: ___Lost Lake County Park Nature Trail____

How best to access site for conducting a site evaluation?_________________________________

____

____

River Mile (if known): ____

Approximate Distance from SJR: ____

Proximity to levee toe of most seepage (feet) – or through levee: __________________________

Description of Seepage (describe what was observed):

☐ Boils or piping ☐ Erosion on levee ☐ Levee close to overtopping ☐ River stage

☒ Visible standing water ☐ Waterlogged field(s) ☐ Monitoring Well Elevations increase

Description (what observations occurred and supporting data is available): _____Restoration flows on the San Joaquin flooded portions of the Lost Lake County Park Nature Trail in the town of Friant. The sections I saw underwater were at the far south end of the park and ankle deep. I am unsure of how extensive flooding was in other portions since I wasn't prepared to wade the length of the trail (Brandon Hill). ___

When was this seepage first noticed, and how long has it been going on? _

____

SJRRP Seepage Hotline Intake Form

Type of Potential Impact (describe the potential impacts of concern):

☐ Crop impacts ☒ Land Access (roads) ☐ Levee or Structure Integrity

Description (extent and magnitude of anticipated impacts including supporting data such as EM probes, crop records, etc.): ____

_____Would be unable to use trail.____

____

____

Interim Flow Relationship (describe why the impact is a result of the SJRRP flows.)

☒ River Stage ☐ Drainage ☐ Canals ☐ Irrigation ☐ Flood Operations

Description (include recent land-use practices in the area as well as any efforts to reduce or avoid adverse impacts) : ____

____

____

____

Has a SJRRP monitoring well been requested? ☐ Yes ☒ No

Has the parcel been identified as at risk? ☐ No ☐ At a Public Meeting
☐ In EIS/R Comments ☐ Personal Communication with SJRRP Staff

Description (insert text): ____

__________According to Manuel Diaz, the last time the trail flooded was in '97. Manuel will go out and take a look and call Margaret Gidding back Tuesday morning to discuss any further action or coordinate a site visit by Reclamation staff.____

Immediacy of Response Needed (identify the timeframe for decision making)

☐ Impacts are imminent ☐ Levees at risk ☐ Adjust Future Flows ☐ Impacts Occurred

Description: ____

____

____

Please attach additional comments as necessary.

SJRRP Seepage Site Evaluation Form

Seepage Report ID Number: *# 7*

Date and Time of Site Evaluation: *Monday April 19, 2010*

Names of personnel attending site evaluation, agencies belonging to and contact info (phone):
Fresno County Resources Division, Park Services Supervisor, Manuel Diaz: (559) 281-4376

Landowner Name, phone, contact info: *Fresno County, Manuel Diaz: (559) 281-4376*

Seepage Location

Address or Parcel: *Lost Lake County Park Nature Trail*

How easy was access? How should it be accessed in the future?

River Mile (if known):

Approximate Distance from SJR: *50 feet*

Proximity to levee toe of most seepage (feet) – or through levee:

GPS Coordinates tracing Seepage Boundaries:

If possible, please attach an aerial map and mark seepage extent on it.

Immediacy of Response Needed (identify the timeframe for decision making)

☐ Levee Failure ☐ Imminent ☐ Adjust Future Flows ☐ Impacts Occurred

Description:

SJRRP Seepage Site Evaluation Form

Description of Seepage (describe what was observed):

☐ Boils or piping ☐ Erosion on levee ☐ Levee close to overtopping ☐ River stage

☒ Visible standing water ☐ Waterlogged field(s) ☐ Monitoring Well Elevations increase

Description (what observations occurred and what supporting data is available): *Accumulated standing water from recent rains was observed.*

Type of Potential Impact (describe the potential impacts of concern):

☐ Crop impacts ☒ Land Access (roads) ☐ Levee or Structure Integrity

Description (extent and magnitude of anticipated impacts including supporting data such as EM probes, crop records, etc.): *The Nature Trail would be unable to be used.*

Interim Flow Relationship (describe why the impact is a result of the SJRRP Flows. Include recent land-use practices in the area as well as any efforts to reduce or avoid adverse impacts)

☐ River Stage ☐ Drainage ☐ Canals ☐ Irrigation ☐ Flood Operations

Description: *Last time there was water on the Lost Lake County Park Nature Trail was in 1997. Per the site evaluation, this is not actually flooding but standing water accumulated from the recent rains.*

Do you recommend a particular response action to reduce or avoid impacts? Explain.

Recommend continued monitoring for the next few weeks by the Fresno County Parks department.

Photo Log

Please include a Photo number or ID, the time (and date, if different from Site Evaluation date) the photo was taken, the location the photo was taken from and a description of the image subject and important points shown in it.

1)

2)

3)

4)

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8)

9)

10)

11)

12)

Please attach additional pages as needed to describe all photos taken, or to add additional information, comments, records or supporting data to the Site Evaluation.

SJRRP Seepage Response Decision Form

Date and Time of Response: April 21, 2010

Address or Parcel: Lost Lake County Park Nature Trail

Seepage Report ID Number: #7

Relevant Data:

Groundwater Observations:

Site Evaluation: Standing water may be due to recent rains rather than river stage.

Landowner Input:

Comments:

Action:

Adjust Future Flows Responses

☐ Restrictions on Maximum Release ☐ Restrictions on ramping rates and duration

☐ Reduction of Restoration Flow releases at Friant Dam

☐ Slurry Walls ☐ Seepage Berms ☐ Drainage Interceptor Ditches ☐ Tile Drains

Immediate Action

☐ Emergency Measures (sandbagging, riprap, etc)

☐ Reduction of Restoration Flow releases at Friant Dam

☐ Redirection of flows at Chowchilla Bifurcation Structure (reduces impacts in Reach 2B on)

☐ Delivery of flows to Exchange Contractors at Mendota Pool (reduces impacts in Reach 3 on)

☐ Delivery of flows to Exchange Contractors and Refuges at Sack Dam (reduces impacts in Reach 4A and downstream)

☐ Compensation

Comments: Continued monitoring for the next few weeks.

Follow-Up:

☐ Restrictions on Releases ☐ Study on Structural Improvements

Comments:

SJRRP Seepage Hotline Intake Form

Responder Name: Ali Gasdick

Date and Time Received: Wednesday, April 21, 2010 11:41 AM

Seepage Report ID Number: #8

Contact Information

Landowner Name: Shawn Coburn

Contact Email or Phone: 8074 W. Eucalyptus, Dos Palos, CA 93620; (559) 696-7777

Date and Time Contacted: Return email sent 4/23/2010

Seepage Location

Address or Parcel: Reach 3

How best to access site for conducting a site evaluation?_____

River Mile (if known): _____

Approximate Distance from SJR: _____

Proximity to levee toe of most seepage (feet) – or through levee: _____

Description of Seepage (describe what was observed):

☐ Boils or piping ☐ Erosion on levee ☐ Levee close to overtopping ☐ River stage

☐ Visible standing water ☐ Waterlogged field(s) ☐ Monitoring Well Elevations increase

Description:

Landowner is concerned about potential for Interim Flows to affect future almond orchard

When was this seepage first noticed, and how long has it been going on? _____

SJRRP Seepage Hotline Intake Form

Type of Potential Impact (describe the potential impacts of concern):

☒ Crop impacts ☐ Land Access (roads) ☐ Levee or Structure Integrity

Description:

"I was under the impression that there will be no third party impacts, with this in mind I have been keeping data on this property since 2001, and I also planted a test orchard of almond trees. I have a nursery in place that has 60,000 trees being budded in May and will be planted in Dec of 2010 along with an irrigation system that I have purchased. This is quite a large investment, so you can understand my concern. We have sent in the TEP's and have also allowed CCID to install some additional monitoring sites. I would like to start the process of evaluating this property; I do not want to have a bunch of dead trees in 2014. I also have great concern with the number that Steven quoted to me with regards to ground water levels and almond trees, I do not know if these are USBR numbers but 6' to 8' feet of dry dirt to grow trees in is not sustainable. I have UC data to prove that."

Interim Flow Relationship (describe why the impact is a result of the SJRRP flows.)

☒ River Stage ☐ Drainage ☐ Canals ☐ Irrigation ☐ Flood Operations

Description:

Has a SJRRP monitoring well been requested? ☒ Yes ☐ No

Has the parcel been identified as at risk? ☐ No ☐ At a Public Meeting
☐ In EIS/R Comments ☐ Personal Communication with SJRRP Staff

Description:

Immediacy of Response Needed (identify the timeframe for decision making)

☐ Impacts Occurred ☐ Levees at risk ☐ Impacts are imminent ☐ Adjust Future Flows
☐ Potential Future Impacts

Description: Landowner would like to evaluate the property to ensure future Restoration and Interim Flows do not impact his proposed almond orchard.

Please attach additional comments as necessary.

SJRRP Seepage Site Evaluation Form

Seepage Report ID Number: *8*

Date and Time of Site Evaluation: *April 26, 2010*

Names of personnel attending site evaluation, agencies belonging to and contact info (phone): *1 Joe Brummer, soil scientist (consultant)*

Stephen Lee, hydrologist (BOR)

Shawn Coburn (landowner) (559)696-7777

Landowner Name, phone, contact info: *Shawn Coburn (559)696-7777*

Seepage Location

Address or Parcel: *Reach 3 of the San Joaquin River, approximately 1 mile downstream of Mendota Dam on the left bank*

How easy was access? How should it be accessed in the future?

River Mile (if known): ~ *200*

Approximate Distance from SJR: *adjacent*

Proximity to levee toe of most seepage (feet) – or through levee: N/A

GPS Coordinates tracing Seepage Boundaries: **N/A**

If possible, please attach an aerial map and mark seepage extent on it.

Immediacy of Response Needed (identify the timeframe for decision making)

☐ Levee Failure ☐ Imminent ☐ Adjust Future Flows ☐ Impacts Occurred

Description: *No immediate decisions anticipated*

SJRRP Seepage Site Evaluation Form

Description of Seepage (describe what was observed):

☐ Boils or piping ☐ Erosion on levee ☐ Levee close to overtopping ☐ River stage

☐ Visible standing water ☐ Waterlogged field(s) ☐ Monitoring Well Elevations increase

Description (what observations occurred and what supporting data is available): *No seepage is currently occuring. Landowner is concerned: regarding potential seepage impacts that the SJRRP Interim and Restoration flows may have on his farming operations. Mr. Coburn showed us an existing 40 acre almond orchard and 288 acres that are currently planted in alfalfa on his property. The alfalfa fields are planned to be converted to almond orchards with a planting date set for December, 2010.*

Type of Potential Impact (describe the potential impacts of concern):

☒ Crop impacts ☐ Land Access (roads) ☐ Levee or Structure Integrity

Description (extent and magnitude of anticipated impacts including supporting data such as EM probes, crop records, etc.): *Mr. Coburn said the existing 40 acre almond orchard was damaged by high water associated with the flood flows in the San Joaquin River in 2006. The orchard currently appears to be in fair to good condition. CCID has recently installed 3 monitor wells on the property and the SJR near Mendota stream gage is located on the property. The water level was measured in one of the CCID wells at approximately 13 feet below land surface.*

Interim Flow Relationship (describe why the impact is a result of the SJRRP Flows. Include recent land-use practices in the area as well as any efforts to reduce or avoid adverse impacts)

☐ River Stage ☐ Drainage ☐ Canals ☐ Irrigation ☐ Flood Operations

Description: Mr. Coburn was extremely concerned regarding the SJRRP draft seepage thresholds (water table 6-8 ft below land surface) proposed for tree and vine crops. He felt that a much deeper buffer zone would be needed to be protective against crop damage and suggested that we refer to the University of California Integrated Pest Management (IPM) Manual.

Do you recommend a particular response action to reduce or avoid impacts? Explain.*The SJRRP should review relevant research regarding rooting depths of almond trees to evaluate the SJRRP draft buffer zone (6-8 feet) proposed for tree and vine crops. Appropriate soil salinity and groundwater monitoring will be performed on the property and the data considered in flow evaluations if the landowner permits access for monitoring*.

Memo For: File

From: Stephen Lee (SCC-111)

CC: Ali Gasdick, Dave Mooney, Katrina Harrison, Margaret Gidding, Craig Moyle

Subject: Meeting with landowner: Shawn Coburn, Reach 3 San Joaquin River

Date: April 26, 2010

1. Joe Brummer (consultant) and Stephen Lee (BOR) met with Shawn Coburn at his property located on the San Joaquin River approximately 1 mile downstream of Mendota Dam on the left bank. Mr. Coburn expressed concern regarding potential seepage impacts that the SJRRP Interim and Restoration flows may have on his farming operations. Mr. Coburn showed us an existing 40 acre almond orchard and 288 acres that are currently planted in alfalfa on his property. The alfalfa fields are planned to be converted to almond orchards with a planting date set for December, 2010.

2. Mr. Coburn said the existing 40 acre almond orchard was damaged by high water associated with the flood flows in the San Joaquin River in 2006. The orchard currently appears to be in fair to good condition. CCID has recently installed 3 monitor wells on the property and the SJR near Mendota stream gage is located on the property. The water level was measured in one of the CCID wells at approximately 13 feet below land surface.

3. Mr. Coburn was extremely concerned regarding the SJRRP draft seepage thresholds (water table 6-8 ft below land surface) proposed for tree and vine crops. He felt that a much deeper buffer zone would be needed to be protective against crop damage and suggested that we refer to the University of California Integrated Pest Management (IPM) Manual.

4. We told Mr. Coburn that the SJRRP could perform a soil salinity assessment and install additional monitoring wells or monitor the existing CCID wells on the property to assess groundwater and soil conditions and use the information in the decision making process for the interim and restoration flow evaluations. We told him that an access agreement (TEP) would need to be signed before we could proceed with any monitoring. He said that he would consult with his partners in the property and get back with us.

5. Reccomendations: The SJRRP should review relevant research regarding rooting depths of almond trees to evaluate the SJRRP draft buffer zone (6-8 feet) proposed for tree and vine crops. Appropriate soil salinity and groundwater monitoring will be performed on the property and the data considered in flow evaluations if the landowner permits access for monitoring.

SJRRP Seepage Response Decision Form

Date and Time of Response: April 27, 2010

Address or Parcel: Coburn property, 1 mile downstream of Mendota Dam in Reach 3 on the left bank

Seepage Report ID Number: #8

Relevant Data:

Groundwater Observations: CCID well was measured at 13 feet below ground surface.

Site Evaluation: Existing 40 acre almond orchard was damaged by high flows in 2006. The orchard is currently in good condition. 288 acres of alfalfa are going to be planted with almonds in December 2010. CCID has 3 monitoring wells on the property.

Landowner Input: Mr. Coburn was concerned regarding the SJRRP draft seepage thresholds (water table 6-8 ft below land surface) proposed for tree and vine crops. He felt that a much deeper buffer zone would be needed to be protective against crop damage and suggested that we refer to the University of California Integrated Pest Management (IPM) Manual.

Action:

Adjust Future Flows Responses

☐ Restrictions on Maximum Release ☐ Restrictions on ramping rates and duration

☐ Reduction of Restoration Flow releases at Friant Dam

☐ Slurry Walls ☐ Seepage Berms ☐ Drainage Interceptor Ditches ☐ Tile Drains

Immediate Action

☐ Emergency Measures (sandbagging, riprap, etc)

☐ Reduction of Restoration Flow releases at Friant Dam

☐ Redirection of flows at Chowchilla Bifurcation Structure (reduces impacts in Reach 2B on)

☐ Delivery of flows to Exchange Contractors at Mendota Pool (reduces impacts in Reach 3 on)

☐ Delivery of flows to Exchange Contractors and Refuges at Sack Dam (reduces impacts in Reach 4A and downstream)

☐ Compensation

Follow-Up:

☐ Restrictions on Releases ☐ Study on Structural Improvements

Comments: Appropriate soil salinity and groundwater monitoring will be performed on the property and the data considered in flow evaluations if the landowner permits access for monitoring.

SJRRP Seepage Hotline Intake Form

Responder Name: Dave Mooney

Date and Time Received: Wednesday, April 28, 2010

Seepage Report ID Number: __9

Contact Information

Landowner Name: Contact Name: Ken Klemme, Mosquito Abatement District in Madera

Contact Email or Phone:(559)674-6729 (office); (559)232-3955 (cell); kenk_mmvcd@sbcglobal.net

Date and Time Contacted: 8:00 am, Thursday, April 29, 2010

Seepage Location

Address or Parcel: 20 acres adjacent to the San Joaquin River

How best to access site for conducting a site evaluation? Limited access, as it is heavily wooded

River Mile (if known): _____

Approximate Distance from SJR: Adjacent to

Proximity to levee toe of most seepage (feet) – or through levee: _____

Description of Seepage (describe what was observed):

☐ Boils or piping ☐ Erosion on levee ☐ Levee close to overtopping ☐ River stage

☒ Visible standing water ☐ Waterlogged field(s) ☐ Monitoring Well Elevations increase

Description:

20 acres of low areas adjacent to the river filled in with water and required mosquito treatment. The area is heavily wooded and therefore application required a plane. Ken was looking for the potential to fill in the problem or providing access for ground crews.

When was this seepage first noticed, and how long has it been going on? Unknown

SJRRP Seepage Hotline Intake Form

Type of Potential Impact (describe the potential impacts of concern):

☐ Crop impacts ☒ Land Access (roads) ☐ Levee or Structure Integrity

Description:

Heavily wooded area, not easily accessible for mosquito abatement. Potential human health impacts due to the increase in mosquitos from greater standing water.

Interim Flow Relationship (describe why the impact is a result of the SJRRP flows.)

☒ River Stage ☐ Drainage ☐ Canals ☐ Irrigation ☐ Flood Operations

Description:

High San Joaquin River levels cause standing water in adjacent low areas, increasing the mosquito population.

Has a SJRRP monitoring well been requested? ☐ Yes ☒ No

Has the parcel been identified as at risk? ☒ No ☐ At a Public Meeting
☐ In EIS/R Comments ☐ Personal Communication with SJRRP Staff

Description: *[Insert text here describing when and with what language the parcel was identified as at risk]*

Immediacy of Response Needed (identify the timeframe for decision making)

☐ Impacts Occurred ☐ Levees at risk ☐ Impacts are imminent ☐ Adjust Future Flows
☒ Potential Future Impacts

Description: If necessary to spray for mosquitos again, may again be access issues.

Please attach additional comments as necessary.

SJRRP Seepage Site Evaluation Form

Seepage Report ID Number: *# 9*

Date and Time of Site Evaluation: *April 30, 2010*

Names of personnel attending site evaluation, agencies belonging to and contact info (phone): *Joe Brummer (consultant), Stephen Lee (BOR), Dave Mooney (BOR), Ken Klemme (Madera County Mosquito and Vector Control District) and Todd ??? (Madera County)*

Landowner Name, phone, contact info: *unknown*

Seepage Location

Address or Parcel: *Located in Reach 3 on the San Joaquin River approximately 0.5 miles downstream of Ave. 7 on the right bank, directly across the river from the city of Firebaugh. The property is a low lying area of approximately 20 acres*

How easy was access? How should it be accessed in the future? *7th street and Sequoia terrace*

River Mile (if known):

Approximate Distance from SJR:

Proximity to levee toe of most seepage (feet) – or through levee:

GPS Coordinates tracing Seepage Boundaries:

If possible, please attach an aerial map and mark seepage extent on it.

Immediacy of Response Needed (identify the timeframe for decision making)

☐ Levee Failure ☐ Imminent ☐ Adjust Future Flows ☐ Impacts Occurred

Description: *Only a long-term response is needed.*

SJRRP Seepage Site Evaluation Form

Description of Seepage (describe what was observed):

☐ Boils or piping ☐ Erosion on levee ☐ Levee close to overtopping ☐ River stage

☒ Visible standing water ☐ Waterlogged field(s) ☐ Monitoring Well Elevations increase

Description (what observations occurred and what supporting data is available): *The property is a low lying area of approximately 20 acres where water from the San Joaquin River was observed ponding on the land surface in several locations. The property owner is unknown. Mr. Klemme said Madera County has sprayed the area for mosquitoes recently by using aerial application. The cost of the aerial application is approximately $1500 per application. The frequency of application needed is approximately 2 times per month. In the past the City of Firebaugh has sprayed the area for mosquito control, but is not currently performing the task.*

Type of Potential Impact (describe the potential impacts of concern):

☐ Crop impacts ☒ Land Access (roads) ☐ Levee or Structure Integrity

Description (extent and magnitude of anticipated impacts including supporting data such as EM probes, crop records, etc.):

Interim Flow Relationship (describe why the impact is a result of the SJRRP Flows. Include recent land-use practices in the area as well as any efforts to reduce or avoid adverse impacts)

☒ River Stage ☐ Drainage ☐ Canals ☐ Irrigation ☐ Flood Operations

Description:

Do you recommend a particular response action to reduce or avoid impacts? Explain. Mr. Klemme asked if the SJRRP could assist in mosquito control by either providing funding for the aerial applications or assistance in clearing pathways for his personnel to access the property by ATV. We told him we would consider his request and get back to him.

Photo Log

Please include a Photo number or ID, the time (and date, if different from Site Evaluation date) the photo was taken, the location the photo was taken from and a description of the image subject and important points shown in it.

1) Property Location Map
2)
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12)

Please attach additional pages as needed to describe all photos taken, or to add additional information, comments, records or supporting data to the Site Evaluation.

Photo 1: Property Location Map

SJRRP Seepage Response Decision Form

Date and Time of Response: May 3, 2010

Address or Parcel: 20 low-lying acres near Firebaugh .5 mile north of Avenue 7 ½

Seepage Report ID Number: #9

Relevant Data:

Site Evaluation: *The property is a low lying area of approximately 20 acres where water from the San Joaquin River was observed ponding on the land surface in several locations. The property owner is unknown. Mr. Klemme said Madera County has sprayed the area for mosquitoes recently by using aerial application. The cost of the aerial application is approximately $1500 per application. The frequency of application needed is approximately 2 times per month. In the past the City of Firebaugh has sprayed the area for mosquito control, but is not currently performing the task.*

Landowner Input: Mr. Klemme asked if the SJRRP could assist in mosquito control by either providing funding for the aerial applications or assistance in clearing pathways for his personnel to access the property by ATV.

Action:

Adjust Future Flows Responses

☐ Restrictions on Maximum Release ☐ Restrictions on ramping rates and duration

☐ Reduction of Restoration Flow releases at Friant Dam

☐ Slurry Walls ☐ Seepage Berms ☐ Drainage Interceptor Ditches ☐ Tile Drains

Immediate Action

☐ Emergency Measures (sandbagging, riprap, etc)

☐ Reduction of Restoration Flow releases at Friant Dam

☐ Redirection of flows at Chowchilla Bifurcation Structure (reduces impacts in Reach 2B on)

☐ Delivery of flows to Exchange Contractors at Mendota Pool (reduces impacts in Reach 3 on)

☐ Delivery of flows to Exchange Contractors and Refuges at Sack Dam (reduces impacts in Reach 4A and downstream)

☐ Compensation

Comments: The SJRRP unfortunately cannot justify providing funding or assistance for vector control. SJRRP staff will follow up with the Madero Co Vector Control District

SJRRP Seepage Hotline Intake Form

Responder Name: Dave Mooney

Date and Time Received:_____

Seepage Report ID Number: 10

Contact Information

Landowner Name: Samarin Farms Farm Manager: John Garcia; Caller: Randy Houk;

Contact Email or Phone:John Garcia: 559 860 8692

Date and Time Contacted: Monday, May 3, 2010

Seepage Location

Address or Parcel: Samarin Farms property, East of R3-7

How best to access site for conducting a site evaluation?_____

River Mile (if known): _____

Approximate Distance from SJR: 30 yards

Proximity to levee toe of most seepage (feet) – or through levee: 30 yards

Description of Seepage (describe what was observed):

☐ Boils or piping ☐ Erosion on levee ☐ Levee close to overtopping ☐ River stage

☐ Visible standing water ☐ Waterlogged field(s) ☐ Monitoring Well Elevations increase

Description:

[Enter what observations occured and any supporting data that is available.]

When was this seepage first noticed, and how long has it been going on? _____

SJRRP Seepage Hotline Intake Form

Type of Potential Impact (describe the potential impacts of concern):

☐ Crop impacts ☐ Land Access (roads) ☐ Levee or Structure Integrity

Description:

[Please enter information regarding the extent and magnitude of anticipated impacts including supporting data such as EM probes, hand augers, crop records, etc.]

Interim Flow Relationship (describe why the impact is a result of the SJRRP flows.)

☐ River Stage ☐ Drainage ☐ Canals ☐ Irrigation ☐ Flood Operations

Description:

[Please include recent land-use practices in the area as well as any efforts to reduce or avoid adverse impacts]

Has a SJRRP monitoring well been requested? ☐ Yes ☐ No

Has the parcel been identified as at risk? ☐ No ☐ At a Public Meeting
☐ In EIS/R Comments ☐ Personal Communication with SJRRP Staff

Description: [Insert text here describing when and with what language the parcel was identified as at risk]

Immediacy of Response Needed (identify the timeframe for decision making)

☐ Impacts Occurred ☐ Levees at risk ☐ Impacts are imminent ☐ Adjust Future Flows
☐ Potential Future Impacts

Description: ______

Please attach additional comments as necessary.

SJRRP Seepage Site Evaluation Form

Seepage Report ID Number: *#10*

Date and Time of Site Evaluation: *May 4, 2010*

Names of personnel attending site evaluation, agencies belonging to and contact info (phone): *Joe Brummer (consultant) and Stephen Lee (BOR)*

Landowner Name, phone, contact info: *John Garcia (lease) 559 860 8692*

Seepage Location

Address or Parcel: *Near SJRRP monitor well R3-7 at the property owned by Ken Samarin on the San Joaquin River at RM 199 m on the right bank.*

How easy was access? How should it be accessed in the future?

River Mile (if known): RM *199*

Approximate Distance from SJR: *adjacent*

Proximity to levee toe of most seepage (feet) – or through levee:

GPS Coordinates tracing Seepage Boundaries:

If possible, please attach an aerial map and mark seepage extent on it.

Immediacy of Response Needed (identify the timeframe for decision making)

☐ Levee Failure ☐ Imminent ☐ Adjust Future Flows ☐ Impacts Occurred

Description: No immediate response is needed

Description of Seepage (describe what was observed):

☐ Boils or piping ☐ Erosion on levee ☐ Levee close to overtopping ☐ River stage

☐ Visible standing water ☐ Waterlogged field(s) ☒ Monitoring Well Elevations increase

Description (what observations occurred and what supporting data is available): *The investigation was in response to a call to the SJRRP seepage hotline from Randy Houk (CCC) on behalf of the leasee (John Garcia). Mr. Garcia expressed concern regarding potential seepage impacts that the SJRRP Interim flows may have on his farming operations.*

Two hand auger borings were dug at locations approximately 150 and 450 feet southwest of monitor well R3-7 to determine the depth of the water-table beneath the field. Soil Boring and water-level data is summarized in table 1 below. Groundwater levels measured in the well and the borings ranged from 5.5-6.1 feet below ground surface (bgs).

SJRRP Seepage Site Evaluation Form

Table 1. Water-level data.

Well/Boring	*Lat (dec deg)*	*Lon (dec deg)*	*Date*	*Time*	*Depth to Water (ft bgs)*
R3-7	*36.839913*	*-120.420711*	*5/4/10*	*1048*	*5.68*
Soil Boring 1	*36.835252*	*-120.407084*	*5/4/10*	*1057*	*5.5*
Soil Boring 2	*36.835981*	*-120.406323*	*5/4/10*	*1125*	*6.1*

Type of Potential Impact (describe the potential impacts of concern):

☒ Crop impacts ☐ Land Access (roads) ☐ Levee or Structure Integrity

Description (extent and magnitude of anticipated impacts including supporting data such as EM probes, crop records, etc.): *The field was recently irrigated by flood irrigation in furrows and was being prepared for planting a corn crop at the time of the site visit.*

Interim Flow Relationship (describe why the impact is a result of the SJRRP Flows. Include recent land-use practices in the area as well as any efforts to reduce or avoid adverse impacts)

☐ River Stage ☐ Drainage ☐ Canals ☐ Irrigation ☐ Flood Operations

Description:

Do you recommend a particular response action to reduce or avoid impacts? Explain. The SJRRP should continue to measure groundwater levels in the existing well on the property and evaluate the data collected as part of the flow bench assessments.

Memo For: File

From: Stephen Lee (SCC-111)

CC: Ali Gasdick, Dave Mooney, Katrina Harrison

Subject: Seepage Hotline Call from Randy Houk: (John Garcia – leasee), Reach 3 San Joaquin River

Date: May 4, 2010

1. Joe Brummer (consultant) and Stephen Lee (BOR) investigated seepage conditions near SJRRP monitor well R3-7 at the property owned by Ken Samarin on the San Joaquin River at RM 199 m on the right bank. The investigation was in response to a call to the SJRRP seepage hotline from Randy Houk (CCC) on behalf of the leasee (John Garcia). Mr. Garcia expressed concern regarding potential seepage impacts that the SJRRP Interim flows may have on his farming operations. The field was recently irrigated by flood irrigation in furrows and was being prepared for planting a corn crop at the time of the site visit.

2. Two hand auger borings were dug at locations approximately 150 and 450 feet southwest of monitor well R3-7 to determine the depth of the water-table beneath the field. Soil Boring and water-level data is summarized in table 1 below. Groundwater levels measured in the well and the borings ranged from 5.5-6.1 feet below ground surface (bgs).

   Table 1. Water-level data.

Well/Boring	Lat (dec deg)	Lon (dec deg)	Date	Time	Depth to Water (ft bgs)
R3-7	36.839913	-120.420711	5/4/10	1048	5.68
Soil Boring 1	36.835252	-120.407084	5/4/10	1057	5.5
Soil Boring 2	36.835981	-120.406323	5/4/10	1125	6.1

3. I contacted Mr. Garcia by phone and informed him that the water levels we observed should not impact his farming operation. Monitor well R3-7 is set up for real time reporting on the SJRRP website and is a good indicator of groundwater levels beneath the field at the site.

4. Recommendation: The SJRRP should continue to measure groundwater levels in the existing well on the property and evaluate the data collected as part of the flow bench assessments.

SJRRP Seepage Response Decision Form

Date and Time of Response: *May 5, 2010*

Address or Parcel: *Reach 3 of the SJR, near Monitoring Well R3-7 at River Mile 199*

Seepage Report ID Number: *10*

Relevant Data:

Groundwater Observations: Two hand auger borings were dug at locations approximately 150 and 450 feet southwest of monitor well R3-7 to determine the depth of the water-table beneath the field. Soil Boring and water-level data is summarized in table 1 below. Groundwater levels measured in the well and the borings ranged from 5.5-6.1 feet below ground surface (bgs).

Table 1. Water-level data.

Well/Boring	Lat (dec deg)	Lon (dec deg)	Date	Time	Depth to Water (ft bgs)
R3-7	36.839913	-120.420711	5/4/10	1048	5.68
Soil Boring 1	36.835252	-120.407084	5/4/10	1057	5.5
Soil Boring 2	36.835981	-120.406323	5/4/10	1125	6.1

Site Evaluation: The field was recently irrigated by flood irrigation in furrows and was being prepared for planting a corn crop at the time of the site visit.

Landowner Input: Mr. Garcia expressed concern regarding potential seepage impacts that the SJRRP Interim flows may have on his farming operations.

Comments:

SJRRP Seepage Response Decision Form

Action:

Adjust Future Flows Responses

☐ Restrictions on Maximum Release ☐ Restrictions on ramping rates and duration

☐ Reduction of Restoration Flow releases at Friant Dam

☐ Slurry Walls ☐ Seepage Berms ☐ Drainage Interceptor Ditches ☐ Tile Drains

Immediate Action

☐ Emergency Measures (sandbagging, riprap, etc)

☐ Reduction of Restoration Flow releases at Friant Dam

☐ Redirection of flows at Chowchilla Bifurcation Structure (reduces impacts in Reach 2B on)

☐ Delivery of flows to Exchange Contractors at Mendota Pool (reduces impacts in Reach 3 on)

☐ Delivery of flows to Exchange Contractors and Refuges at Sack Dam (reduces impacts in Reach 4A and downstream)

☐ Compensation

Comments: Mr. Garcia was contacted by phone and informed that the water levels we observed should not impact his farming operation. Monitor well R3-7 is set up for real time reporting on the SJRRP website and is a good indicator of groundwater levels beneath the field at the site.

Follow-Up:

☐ Restrictions on Releases ☐ Study on Structural Improvements

Comments: The SJRRP will continue to measure groundwater levels in the existing well on the property and evaluate the data collected as part of the flow bench assessments.

SJRRP Seepage Hotline Intake Form

Responder Name: David Mooney

Date and Time Received:Wednesday, May 5, 2010

Seepage Report ID Number: 11

Contact Information

Landowner Name: Richie Iest

Contact Email or Phone:559.706.0749

Date and Time Contacted: Same as date and time above

Seepage Location

Address or Parcel: Richie Iest's Eastern lands, near Sand Slough

How best to access site for conducting a site evaluation?_____

River Mile (if known): _____

Approximate Distance from SJR: _____

Proximity to levee toe of most seepage (feet) – or through levee: _____

Description of Seepage (describe what was observed):

☒ Boils or piping ☐ Erosion on levee ☐ Levee close to overtopping ☐ River stage

☐ Visible standing water ☒ Waterlogged field(s) ☐ Monitoring Well Elevations increase

Description:

Richie Iest reported saturated surface soils on his Eastern lands with water boiling up to the surface.

When was this seepage first noticed, and how long has it been going on? First noticed recently

SJRRP Seepage Hotline Intake Form

Type of Potential Impact (describe the potential impacts of concern):

☒ Crop impacts ☐ Land Access (roads) ☐ Levee or Structure Integrity

Description:

Next week he will be checking out the western properties for cutting.

Interim Flow Relationship (describe why the impact is a result of the SJRRP flows.)

☒ River Stage ☐ Drainage ☐ Canals ☐ Irrigation ☐ Flood Operations

Description:

[Please include recent land-use practices in the area as well as any efforts to reduce or avoid adverse impacts]

Has a SJRRP monitoring well been requested? ☒ Yes ☐ No

Has the parcel been identified as at risk? ☐ No ☐ At a Public Meeting
☐ In EIS/R Comments ☐ Personal Communication with SJRRP Staff

Description: [Insert text here describing when and with what language the parcel was identified as at risk]

Immediacy of Response Needed (identify the timeframe for decision making)

☐ Impacts Occurred ☐ Levees at risk ☒ Impacts are imminent ☐ Adjust Future Flows
☐ Potential Future Impacts

Description: This hotline call involves waterlogged crops and water boiling up to the surface which is concerning.

Please attach additional comments as necessary.

SJRRP Seepage Site Evaluation Form

Seepage Report ID Number: *# 11*

Date and Time of Site Evaluation: *May 6, 2010*

Names of personnel attending site evaluation, agencies belonging to and contact info (phone): *Joe Brummer (consultant) and Stephen Lee (BOR) and Richie Iest (landowner)*

Landowner Name, phone, contact info: *Richie Iest, 559.706.0749*

Seepage Location

Address or Parcel: *on the San Joaquin River downstream of Washington Rd. and East of the Eastside Bypass (approx. RM 169) on the right bank*

How easy was access? How should it be accessed in the future?

River Mile (if known): *169*

Approximate Distance from SJR:

Proximity to levee toe of most seepage (feet) – or through levee:

GPS Coordinates tracing Seepage Boundaries:

If possible, please attach an aerial map and mark seepage extent on it.

Immediacy of Response Needed (identify the timeframe for decision making)

☐ Levee Failure ☐ Imminent ☒ Adjust Future Flows ☐ Impacts Occurred

Description: A moderate timeframe is appropriate

Description of Seepage (describe what was observed):

☐ Boils or piping ☐ Erosion on levee ☐ Levee close to overtopping ☐ River stage

☐ Visible standing water ☒ Waterlogged field(s) ☐ Monitoring Well Elevations increase

Description (what observations occurred and what supporting data is available): *Mr. Iest showed us several areas that covered more than 40 acres in his field that he has delayed harvest due to wet conditions in the fields. A soil boring was dug next to the area where equipment was bogging down at Lat 37 07 22.250 and Lon 120 34 51.590 (deg min sec). The groundwater level rose to a depth of 2.3 feet below ground surface in the boring at 1215 hours. Water level in a nearby monitor well (MW-90) recently installed by the SJRRP was 2.5 feet below ground surface at 1337 hours. A soil salinity assessment was performed in the vicinity of the soil boring. Water from the SJRRP Interim flows was near the riverside toe of the levee in the Eastside Bypass channel at the time of the site visit. The* *landowner showed us an open drain ditch south of the boring site that was discharging water into a drain sump. Some of his lands on the west side of the bypass are equipped with tile drains that have been running consistently this year with the passage of the SJRRP interim flows. According to the landowner these drains ran intermittently last year when the Merced Wildlife Refuge was applying water. Hand auger borings were attempted at several other locations on the property, but were terminated at depths around 2 feet due to a laterally extensive lime/silica hardpan layer in the soil on the property.*

Type of Potential Impact (describe the potential impacts of concern):

☐ Crop impacts ☒ Land Access (roads) ☐ Levee or Structure Integrity

Description (extent and magnitude of anticipated impacts including supporting data such as EM probes, crop records, etc.): *More than 40 acres in his fields he has delayed harvest due to wet conditions*

Interim Flow Relationship (describe why the impact is a result of the SJRRP Flows. Include recent land-use practices in the area as well as any efforts to reduce or avoid adverse impacts)

☐ River Stage ☐ Drainage ☐ Canals ☐ Irrigation ☐ Flood Operations

Description: *SJRRP is interested in monitoring conditions on his property and considering the information as part of the ongoing flow bench evaluations being performed for the SJRRP interim flows.*

Do you recommend a particular response action to reduce or avoid impacts? Explain. The SJRRP should measure groundwater levels in the existing wells and borings on the property and evaluate the soil salinity data collected as part of the assessment. A follow up soil salinity assessment will be conducted in the spring 2012.

Interim flows will be decreased through the reach starting the week of May, 10, 2010. The landowner may be able to finish harvesting if groundwater levels beneath the field respond to the the planned flow reductions and if weather conditions are dry. Water levels in the existing SJRRP monitor wells in the area will be measured hourly with pressure transducers in an effort to understand the relationship between surface water flows in the bypass and shallow groundwater levels at the site.

A drainage evaluation should be performed at the property to assess existing drainage conditions and outline steps toward

SJRRP Seepage Response Decision Form

Date and Time of Response: May 7, 2010

Address or Parcel: Iest property near Eastside Bypass and Sand Slough, RM 169

Seepage Report ID Number: # 11

Relevant Data:

Groundwater Observations: *Groundwater level in a soil boring dug at Lat 37 07 22.250 and Lon 120 34 51.590 (deg min sec) rose to a depth of 2.3 feet below ground surface in the boring at 1215 hours. Water level in a nearby monitor well (MW-90) recently installed by the SJRRP was 2.5 feet below ground surface at 1337 hours.*

Site Evaluation: *Some of his lands on the west side of the bypass are equipped with tile drains that have been running consistently this year with the passage of the SJRRP interim flows*

Landowner Input: *Harvest has been delayed in 40 acres of property due to wet conditions for equipment*

Action:

Adjust Future Flows Responses

☐ Restrictions on Maximum Release ☐ Restrictions on ramping rates and duration

☐ Reduction of Restoration Flow releases at Friant Dam

☐ Slurry Walls ☐ Seepage Berms ☐ Drainage Interceptor Ditches ☐ Tile Drains

Immediate Action

☐ Emergency Measures (sandbagging, riprap, etc)

☐ Reduction of Restoration Flow releases at Friant Dam

☐ Redirection of flows at Chowchilla Bifurcation Structure (reduces impacts in Reach 2B on)

☐ Delivery of flows to Exchange Contractors at Mendota Pool (reduces impacts in Reach 3 on)

☐ Delivery of flows to Exchange Contractors and Refuges at Sack Dam (reduces impacts in Reach 4A and downstream)

Comments: Water levels in the existing SJRRP monitor wells in the area will be measured hourly with pressure transducers in an effort to understand the relationship between surface water flows in the bypass and shallow groundwater levels at the site.

Follow-Up:

☐ Restrictions on Releases ☐ Study on Structural Improvements

Comments: A drainage evaluation will be performed at the property to assess existing drainage conditions and outline steps forward.

SJRRP Seepage Hotline Intake Form

Responder Name: Dave Mooney

Date and Time Received: Monday, May 17, 2010; 8:30 am

Seepage Report ID Number: 12

Contact Information

Landowner Name: Mitigation Land Trust

Contact Email or Phone: Randy Houk: (559) 659-2426 (called hotline)

Date and Time Contacted: Same as received above

Seepage Location

Address or Parcel: Mitigation Land Trust land adjacent to Mendota Pool

How best to access site for conducting a site evaluation?_____

River Mile (if known): _____

Approximate Distance from SJR: _____

Proximity to levee toe of most seepage (feet) – or through levee: _____

Description of Seepage (describe what was observed):

☒ Boils or piping ☐ Erosion on levee ☐ Levee close to overtopping ☐ River stage

☐ Visible standing water ☐ Waterlogged field(s) ☐ Monitoring Well Elevations increase

Description:

Randy called this morning about excessive seepage through the Mendota Pool levee on the MLT lands. This area underwent partial repairs last winter but construction was limited in order to avoid disruption of riparian habitat.

When was this seepage first noticed, and how long has it been going on? Started recently

SJRRP Seepage Hotline Intake Form

Type of Potential Impact (describe the potential impacts of concern):

☐ Crop impacts ☐ Land Access (roads) ☒ Levee or Structure Integrity

Description:

Excessive seepage may cause levee failure.

Interim Flow Relationship (describe why the impact is a result of the SJRRP flows.)

☒ River Stage ☐ Drainage ☒ Canals ☐ Irrigation ☐ Flood Operations

Description:

This area is controlled by pool elevation from DMC and Mendota Dam operations, therefore the link to the SJRRP would be weak.

Has a SJRRP monitoring well been requested? ☒ Yes ☐ No

Has the parcel been identified as at risk? ☐ No ☐ At a Public Meeting
☐ In EIS/R Comments ☐ Personal Communication with SJRRP Staff

Description: [Insert text here describing when and with what language the parcel was identified as at risk]

Immediacy of Response Needed (identify the timeframe for decision making)

☐ Impacts Occurred ☒ Levees at risk ☐ Impacts are imminent ☐ Adjust Future Flows
☐ Potential Future Impacts

Description: ______

Please attach additional comments as necessary.

SJRRP Seepage Site Evaluation Form

Seepage Report ID Number: #12

Date and Time of Site Evaluation: May 17, 2010

Names of personnel attending site evaluation, agencies belonging to and contact info (phone): *Stephen Lee (BOR), Randy Houk (Columbia Canal Company)*

Landowner Name, phone, contact info: *Mitigation Land Trust*

Seepage Location

Address or Parcel: *Mitigation Land Trust (MLT) property in Reach 2B on the Right bank of Mendota Pool at River Mile 206*

How easy was access? How should it be accessed in the future?

River Mile (if known): *206*

Approximate Distance from SJR: *adjacent*

Proximity to levee toe of most seepage (feet) – or through levee: *over berm*

GPS Coordinates tracing Seepage Boundaries:

If possible, please attach an aerial map and mark seepage extent on it.

Immediacy of Response Needed (identify the timeframe for decision making)

☐ Levee Failure ☐ Imminent ☐ Adjust Future Flows ☐ Impacts Occurred

Description: *Potential erosion of a small berm, no immediate levee failure, no potential crop impacts*

SJRRP Seepage Site Evaluation Form

Description of Seepage (describe what was observed):

☐ Boils or piping ☐ Erosion on levee ☐ Levee close to overtopping ☐ River stage

☐ Visible standing water ☐ Waterlogged field(s) ☐ Monitoring Well Elevations increase

Description (what observations occurred and what supporting data is available): T*wo sites where water from Mendota Pool was flowing over the surface of a highly vegetated berm that seperates the Mendota Pool from the MLT property (Photos 1 and 2). The water discharges into a drainage ditch at the edge of the field and ultimately back into the SJR downstream of Mendota Dam (Photo 3). The total flow is estimated at 100-200 gallons per minute. The discharge over the berm appeared to be clear and not moving material or causing excessive erosion on the berm at the time of the visit. CCC staff had recently done some earthwork at the upstream site (Photo 1) to control the flow and will inspect the area on a daily basis. Mr. Houk mentioned that the Mendota Pool stage was 14.0 at the time of the site visit. No flow was entering the field planted in wheat on the MLT property north of the two sites.*

Type of Potential Impact (describe the potential impacts of concern):

☐ Crop impacts ☐ Land Access (roads) ☒ Levee or Structure Integrity

Description (extent and magnitude of anticipated impacts including supporting data such as EM probes, crop records, etc.): *Mr. Houk said that CCC had done some maintenance of the berm in the vicinity of the two sites when the Mendota Pool was dewatered last fall. He requested that the SJRRP mitigate any impacts that result from the flow over the berm.*

Interim Flow Relationship (describe why the impact is a result of the SJRRP Flows. Include recent land-use practices in the area as well as any efforts to reduce or avoid adverse impacts)

☒ River Stage ☐ Drainage ☐ Canals ☐ Irrigation ☐ Flood Operations

Description: *This potential impact is caused by high Mendota Pool stage, which may or may not be as a result of Interim Flows.*

Do you recommend a particular response action to reduce or avoid impacts? Explain. *CCC should monitor the site daily to ensure that the flow is not causing damage to the berm and take appropriate action if excessive erosion is observed or if the flow volume increases significantly.*

SJRRP Seepage Site Evaluation Form

Photo Log

Please include a Photo number or ID, the time (and date, if different from Site Evaluation date) the photo was taken, the location the photo was taken from and a description of the image subject and important points shown in it.

1) Photo 1. Flow over berm at Site 1. Lat 36 47 16.409, Lon 120 21 28.459 (dms), May 17, 2010, 1530 hrs.

2) Photo 2. Flow over berm at Site 2. Lat 36 47 14.911, Lon 120 21 37.769 (dms), May 17, 2010, 1535 hrs.

3) Photo 3. Drainage ditch with water flowing from Site 1 and 2 toward Mendota Pool. Note wheat field on right (looking west) May 17, 2010 1540 hrs.

SJRRP Seepage Response Decision Form

Date and Time of Response: May 17, 2010

Address or Parcel: *Mitigation Land Trust (MLT) property in Reach 2B on the Right bank of Mendota Pool at River Mile 206*

Seepage Report ID Number: #12

Relevant Data:

Groundwater Observations: *The total flow is estimated at 100-200 gallons per minute. The discharge over the berm appeared to be clear and not moving material or causing excessive erosion on the berm at the time of the visit. Mendota Pool stage was 14.0 at the time.*

Site Evaluation:

Landowner Input:

Action:

Adjust Future Flows Responses

☐ Restrictions on Maximum Release ☐ Restrictions on ramping rates and duration

☐ Reduction of Restoration Flow releases at Friant Dam

☐ Slurry Walls ☐ Seepage Berms ☐ Drainage Interceptor Ditches ☐ Tile Drains

Immediate Action

☐ Emergency Measures (sandbagging, riprap, etc)

☐ Reduction of Restoration Flow releases at Friant Dam

☐ Redirection of flows at Chowchilla Bifurcation Structure (reduces impacts in Reach 2B on)

☐ Delivery of flows to Exchange Contractors at Mendota Pool (reduces impacts in Reach 3 on)

☐ Delivery of flows to Exchange Contractors and Refuges at Sack Dam (reduces impacts in Reach 4A and downstream)

☐ Compensation

Comments: *No SJRRP action will occur, as this flow is not causing levee or crop impacts. CCC will continue to monitor and CCC will take appropriate action if excessive erosion occurs.*

Follow-Up:

☐ Restrictions on Releases ☐ Study on Structural Improvements

SJRRP Seepage Hotline Intake Form

Responder Name: David Mooney

Date and Time Received: Wednesday, August 11th, 8:25 AM

Seepage Report ID Number: 13

Contact Information

Landowner Name: Chris White, CCID Manager. Concerned about area near Sand Slough CS.

Contact Email or Phone:(209) 826-1421 Office; (209) 761-4114 Cell; cwhite@ccidwater.org

Date and Time Contacted: Response email sent at 9:31 AM, Wednesday August 11th

Seepage Location

Address or Parcel: Washington Ave / Sand Slough Control Structure / Nickel

How best to access site for conducting a site evaluation?Washington Ave.

River Mile (if known): _____

Approximate Distance from SJR: _____

Proximity to levee toe of most seepage (feet) – or through levee: _____

Description of Seepage (describe what was observed):

☐ Boils or piping ☐ Erosion on levee ☐ Levee close to overtopping ☒ River stage

☐ Visible standing water ☐ Waterlogged field(s) ☒ Monitoring Well Elevations increase

Description:

1) The flows are making it to Washington intermittently.

a. Average flows over Sack Dam have been fluctuating in the 40 cfs to 90 cfs range over the last few weeks. (Although there was a spike flow of around 270 CFS around 2 weeks ago).

b. Although the flows have dropped off over Sack Dam the last day or so yesterday at about 4PM the water was making past Washington avenue into the Bypass.

c. 15-20 cfs through Sand Slough Control Structure on August 10th.

d. At a stage of 13.3 the interim flow water level in the River is only about 5.5' below land surface at the adjacent Nickel LLC property which has been showing impacts from these shallow GW caused by the interim flows. The level has been at only 4.4' below the land surface quite a bit since flows were backed off to 50 cfs. The net result is seepage from the river holding the WS up in the surrounding ground causing impacts.

SJRRP Seepage Hotline Intake Form

2) River to the bypass system connection is a low flow blockage creating high ws in the River even under low flows. Attached is a report which was attached to our comments to your SEA fpor next year's program.

3) Even when the King River flood waters were present in the past the only lasted for a short duration and were terminated allowing shallow groundwater to recede. The interim flows appear to be pumping 40 plus CFS into the reach 4A groundwater keeping the levels elevated.

When was this seepage first noticed, and how long has it been going on? River is not dry, groundwater levels are high.

Type of Potential Impact (describe the potential impacts of concern):

☒ Crop impacts ☐ Land Access (roads) ☐ Levee or Structure Integrity

Description:

Crops may experience salinity impacts with increased groundwater levels.

Interim Flow Relationship (describe why the impact is a result of the SJRRP flows.)

☐ River Stage ☐ Drainage ☐ Canals ☐ Irrigation ☐ Flood Operations

Description:

Interim Flows are sending 15-20 cfs through Sand Slough Control Structure. According to Mr. White, the connection to the bypass system is a low flow blockage creating a high water surface in the river even under low flows.

Has a SJRRP monitoring well been requested? ☒ Yes ☐ No

Has the parcel been identified as at risk? ☐ No ☐ At a Public Meeting
☐ In EIS/R Comments ☐ Personal Communication with SJRRP Staff

Description: [Insert text here describing when and with what language the parcel was identified as at risk]

Immediacy of Response Needed (identify the timeframe for decision making)

☐ Impacts Occurred ☐ Levees at risk ☐ Impacts are imminent ☐ Adjust Future Flows
☒ Potential Future Impacts

"We are experiencing seepage, even under these low flows. Since data collection at SWA has been suspended until next February, together with the programs assumption that the flow isn't making it to Washington, we recommend that the interim flows be suspended also, to allow shallow groundwater levels to recede. "

SJRRP Seepage Site Evaluation Form

Seepage Report ID Number: 13

Date and Time of Site Evaluation: August 19, 2010 afternoon

8/19/2010:

Steve Chedester, SJRECWA Executive Director, 209-827-8616
Chris White, CCID General Manager, 209-826-1421
Randy Houk, CCC General Manager, 559-659-2426
James Nickel, owner, 661-978-5372
Bill Weir, Merced County Farm Advisor, UC Cooperative Extension, 209-723-1725
Chase Hurley, San Luis Canal Co., Mgr., 209-826-5112
Jason Phillips, USBR SJRRP, 916-978-5456
Dave Mooney, USBR SJRRP, 916-978-5458
Stephen Lee, USBR, Fresno, 559-487-5286
Katrina Harrison, USBR SJRRP, 916-978-5465

Seepage Location

Address or Parcel: San Juan Ranch and Sand Slough Control Structure. Access is through Washington Road.

River Mile (if known): Approximately River Mile 170

Approximate Distance from SJR:

Immediacy of Response Needed (identify the timeframe for decision making)

☐ Levee Failure ☐ Imminent ☒ Adjust Future Flows ☐ Impacts Occurred

Description: Sand Slough Control Structure and sand buildup in the Eastside Bypass may be causing increased seepage into adjacent landowner property.

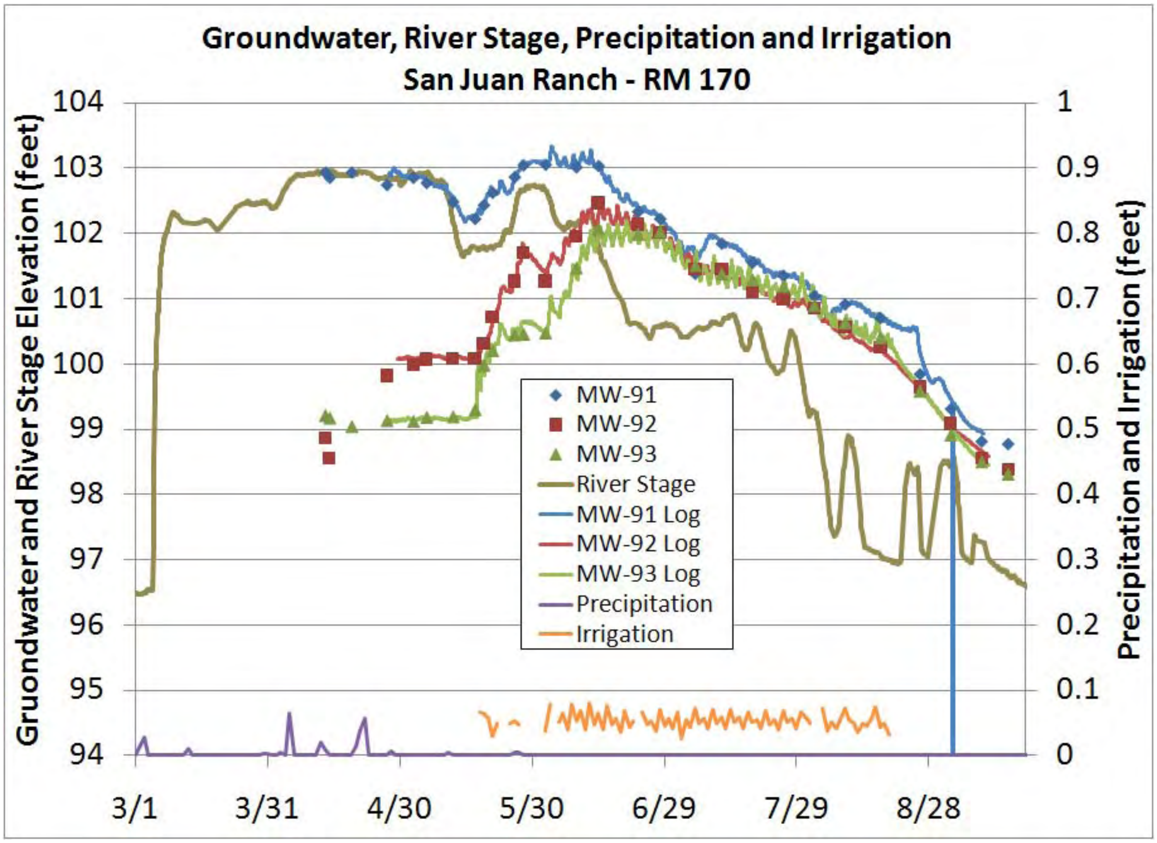
SJRRP Seepage Site Evaluation Form

Description of Seepage (describe what was observed):

☐ Boils or piping ☐ Erosion on levee ☐ Levee close to overtopping ☐ River stage

☐ Visible standing water ☐ Waterlogged field(s) ☒ Monitoring Well Elevations increase

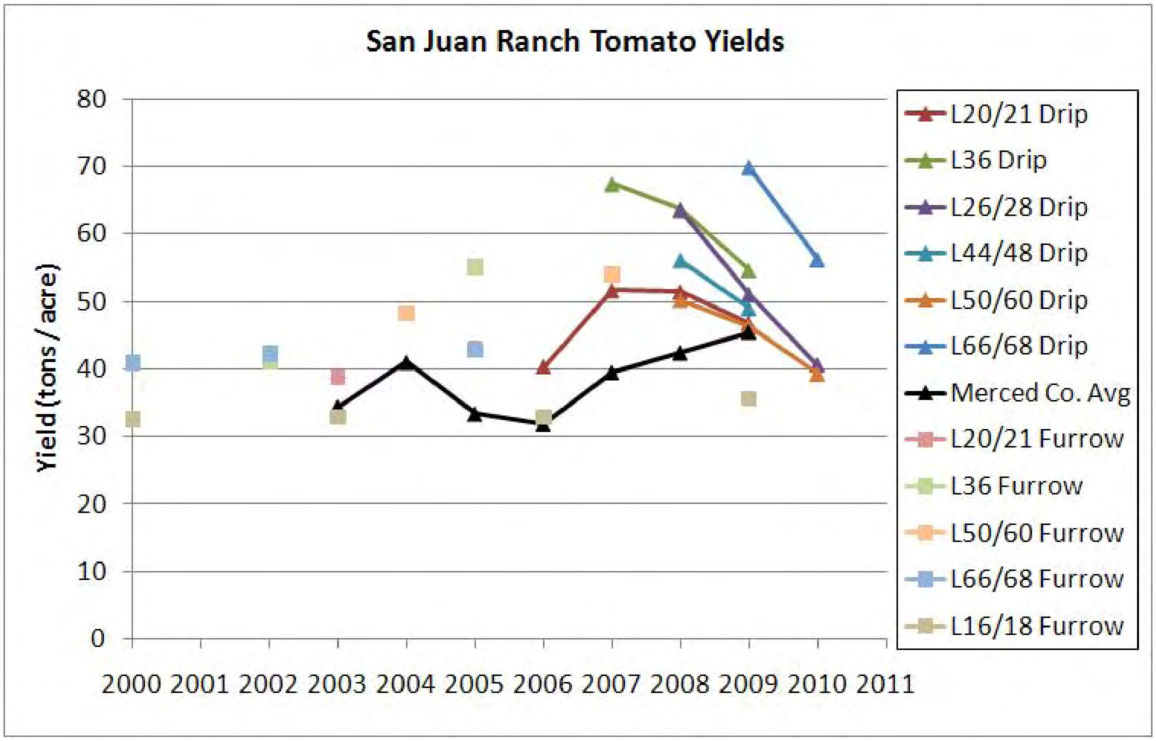
Description (what observations occurred and what supporting data is available):



Type of Potential Impact (describe the potential impacts of concern):

☒ Crop impacts ☐ Land Access (roads) ☐ Levee or Structure Integrity

Description : See plot below for reduction in tomato yields.



Interim Flow Relationship (describe why the impact is a result of the SJRRP Flows. Include recent land-use practices in the area as well as any efforts to reduce or avoid adverse impacts)

☒ River Stage ☐ Drainage ☐ Canals ☐ Irrigation ☐ Flood Operations

Description:

Do you recommend a particular response action to reduce or avoid impacts? Explain.

Allow flows to dry up below Sack Dam in order to allow sand removal.

SJRRP Seepage Response Decision Form

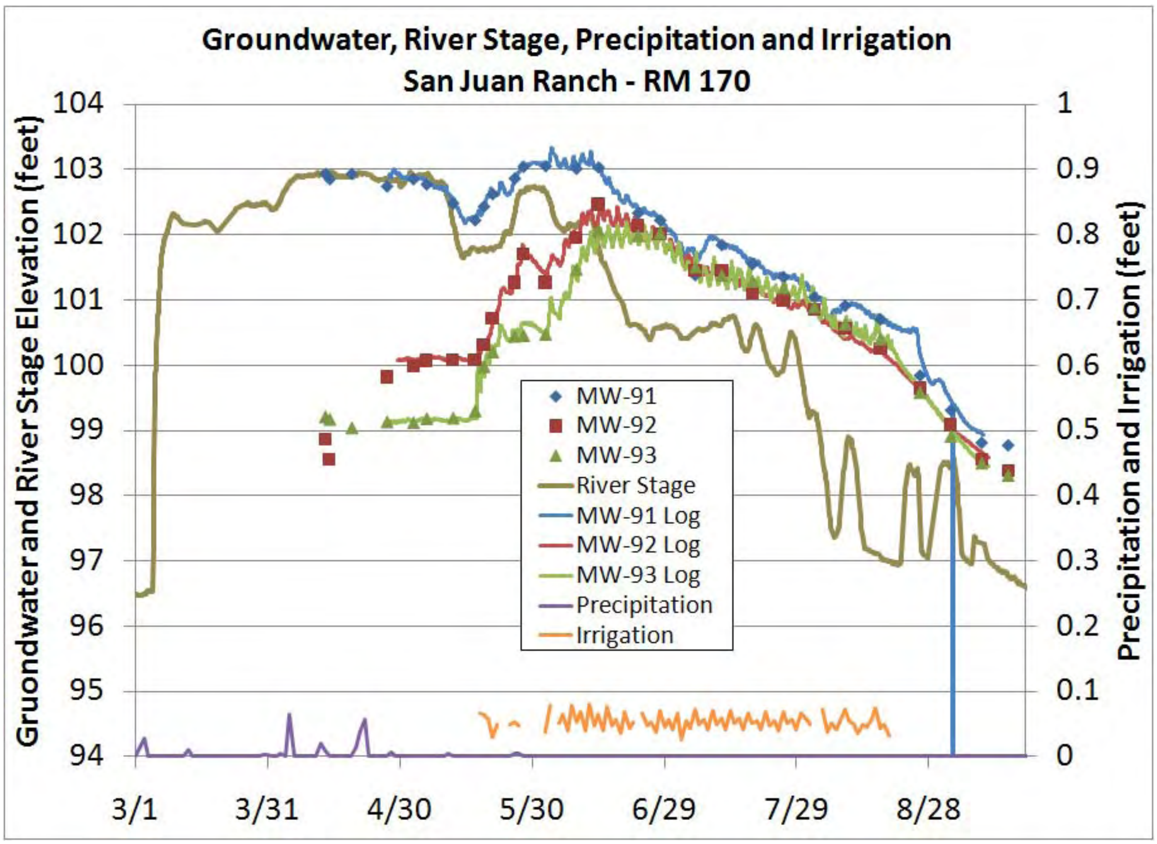
Date and Time of Response: 9/2/2010

Address or Parcel: Reach 4A of the San Joaquin River

Seepage Report ID Number: 13

Relevant Data:

Groundwater Observations:



Site Evaluation: A site evaluation was conducted on 8/19/2010 following a meeting with water district managers and the landowner.

Landowner Input:

Landowner is concerned regarding high groundwater elevations causing salinity buildup in the root zone of the tomato crop.

Comments:

SJRRP Seepage Response Decision Form

Action:

Adjust Future Flows Responses

☒ Restrictions on Maximum Release ☐ Restrictions on ramping rates and duration

☐ Reduction of Restoration Flow releases at Friant Dam

☐ Slurry Walls ☐ Seepage Berms ☐ Drainage Interceptor Ditches ☐ Tile Drains

Immediate Action

☐ Emergency Measures (sandbagging, riprap, etc)

☐ Reduction of Restoration Flow releases at Friant Dam

☐ Redirection of flows at Chowchilla Bifurcation Structure (reduces impacts in Reach 2B on)

☐ Delivery of flows to Exchange Contractors at Mendota Pool (reduces impacts in Reach 3 on)

☐ Delivery of flows to Exchange Contractors and Refuges at Sack Dam (reduces impacts in Reach 4A and downstream)

☐ Compensation

Comments: Flows will be stopped below Sack Dam starting September 2^{nd} to allow time for the river to dry up at Washington Avenue and for landowner in the Eastside Bypass to conduct sand removal.

Follow-Up:

☐ Restrictions on Releases ☒ Study on Structural Improvements

Comments: Reclamation is conducting a study of physical processes in this area with the end goal of recommending solutions to enable more flow to pass this location.

Attachment 6:

Flow Bench Evaluations

SJRRP Flow Bench Evaluation

March 1, 2010

Flows below Friant Dam will increase to 500 cfs on March 1, 2010 based on the Restoration Administrator 2010 Interim Flow Recommendations for the San Joaquin River Restoration Program, February 1 through December 1, 2010. The evaluation of the increase is shown below.

As of February 28, 2010, Reclamation personnel have reported the following:

1. Flows are below known conveyance thresholds (8,000 cfs in Reach 2A, 1,300 cfs in Reach 2B, and 1,300 cfs in Reach 3) based on preliminary real-time data.
2. Mendota Pool operations calls did not identify groundwater seepage or flow problems.
3. The seepage hotline received no calls that reported the potential for probable or imminent seepage problems.
4. Real-time groundwater in Reach 2B and 3 has not risen above identified groundwater level thresholds based on preliminary data.
5. Monitored groundwater wells have not risen above identified groundwater level thresholds with the exception of well R2B-1 which shows a depth below ground surface of 5.85 ft. The buffer zone for this well is 4-6 feet.
6. Measured losses in Reach 2A are around 200 cfs, but have not yet stabilized.
7. Projected groundwater levels from the upcoming increase in flow are below monitoring thresholds except for well R2B-1, which shows a predicted depth below ground surface of 5.4 ft (buffer 4-6 feet).
8. No problems have been reported from the LSJLD and they were notified of potential increase or continuance in flows and identified no potential issues.
9. No problems have been reported from CCID or SLCC and they were notified of potential increase or continuance in flows and identified no potential issues.

Reclamation and Columbia Canal Company representatives visited well R2B-1 on February 24. Reclamation and RMC representatives discussed options on the 25^{th}. The evaluation determined that the existing buffer should remain, but the planned flow increase could proceed with close monitoring.

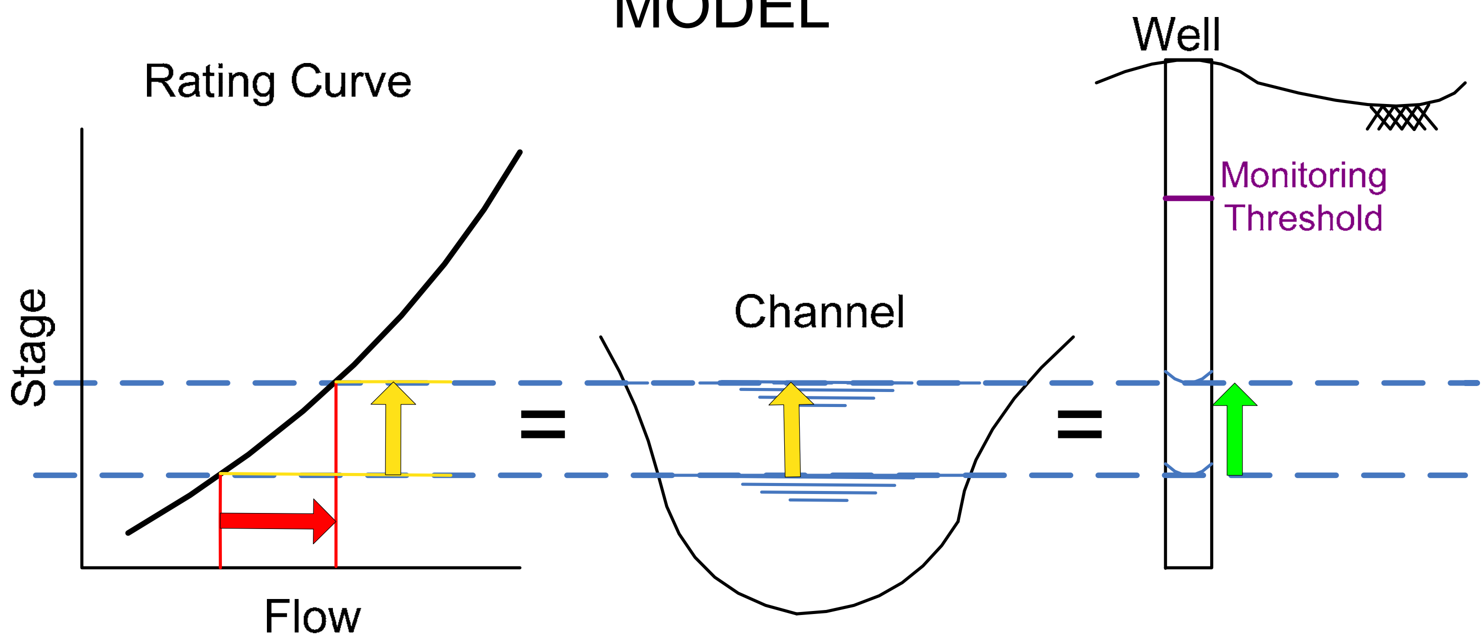
DATA:
Depth versus discharge rating curves along with Exhibit B assumptions and an estimated 300 cfs delivery to Arroyo Canal predicted new groundwater levels. Assumed changes in flows are:

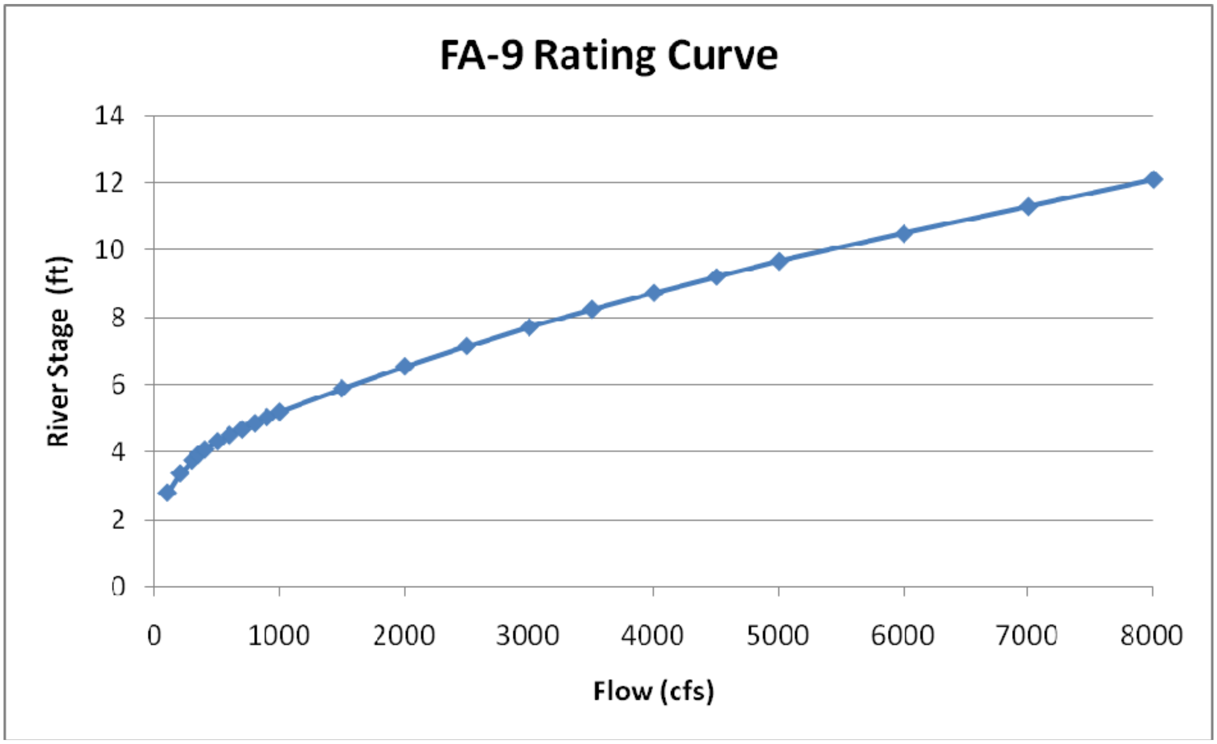
	Current Target (cfs)	Future Target (cfs)	Change (cfs)
Reach 2A	255	375	120
Reach 2B	175	285	110
Reach 3	300	585	285
Reach 4A	0	285	285

Manual measurements via electronic well sounder are taken weekly and provided along with recent flow data in the Weekly Groundwater Report, available at: http://restoresjr.net/activities/if/index.html. Table 1-1 shows the anticipated rise in groundwater. Subsequent pages contain the rating curves for each of these key wells from the TetraTech hydraulic model.

Table 1-1: Predicted Increases in Groundwater Level in Key Wells						
Well_ID	**Site**	**Monitoring Threshold (ft bgs)**	**Screen Depth (ft bgs)**	**Current GW Depth (ft bgs) as of week of 2/22/2010**	**Predicted Increase in Stage (ft)**	**Anticipated New GW Depth (ft)**
FA-9	Reach 2A – Transect 12 – Left	6	12-32	13.62	0.42	13.2
MW-47	Reach 2A – Transect 12 – Right	8	20-40	11.29	0.42	10.9
MA-4	Reach 2A – Transect 13 – Right	8	15-25	17.5	0.43	17.1
MW-49B	Reach 2A – Transect 13 – Left	6	10-20	8.03	0.43	7.6
MW-54B	Reach 2B – San Mateo Ave. – Right	TBD	TBD	21.74	0.7	21.0
MW-55B	Reach 2B – San Mateo Ave. – Left	8	10-15	12.63	0.7	11.9
R2B-1	Reach 2B – Right	6	8-11	5.85	0.46	5.4
R2B-2	Reach 2B – Right	6	17-20	12.98	0.46	12.5
R3-1	Reach 3 – Right	6	9-24	9.88	1.1	8.8
R3-6	Reach 3 – Right	6	17-20	10.05	1.2	8.9
R3-7	Reach 3 – Right	5	17-20	8.88	1.3	7.6
MW-84	Reach 4A – Highway 152 – Right	6	32-52	45.3	1.8	43.5
MW-87B	Reach 4A – Highway 152 - Left	6	TBD	>14 (dry)	1.8	13.2 to dry

SEEPAGE EVALUATION CONCEPTUAL MODEL




FA-9 Rating Curve
River Stage (ft)
Flow (cfs)
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6
8
10
12
14
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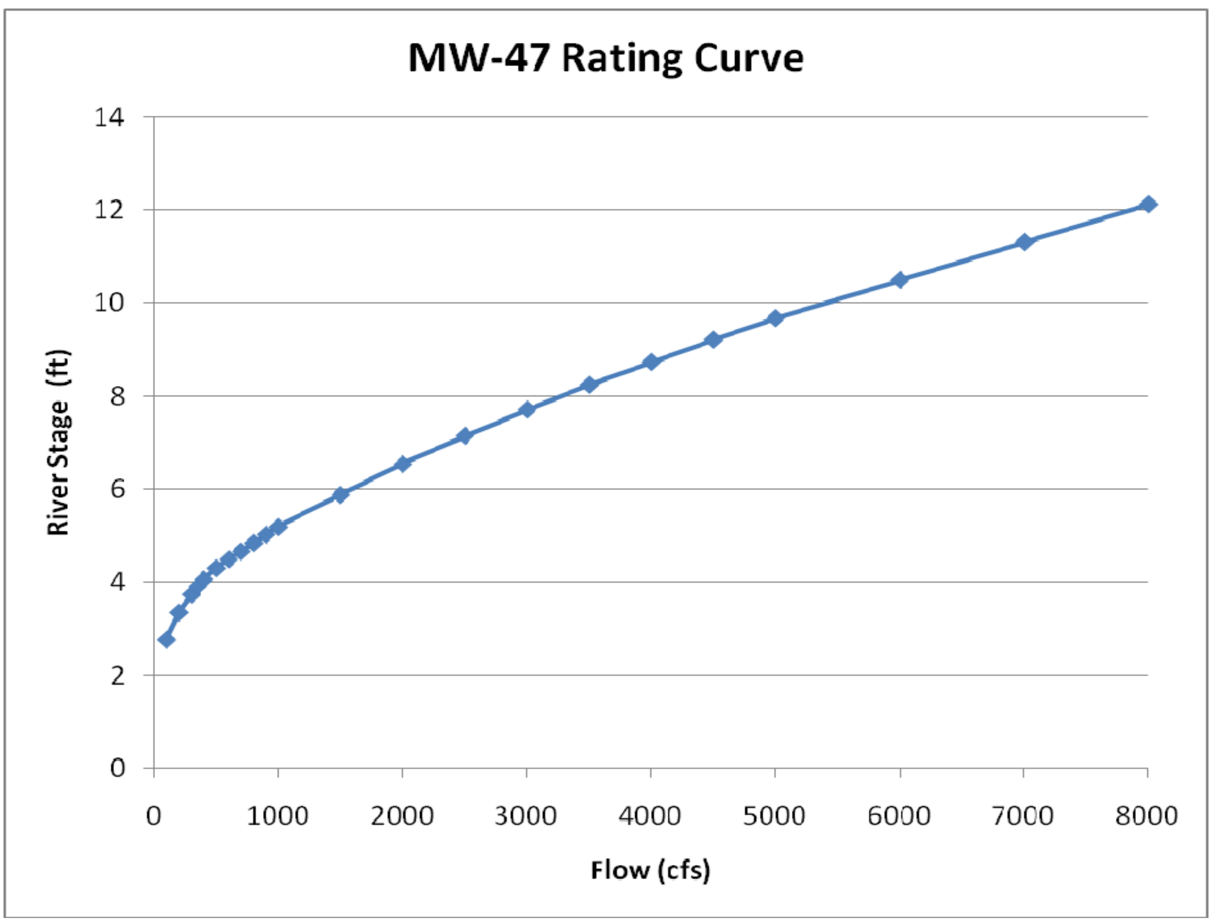
3000
4000
5000
6000
7000
8000


MW-47 Rating Curve
River Stage (ft)
Flow (cfs)
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4
6
8
10
12
14
0
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2000
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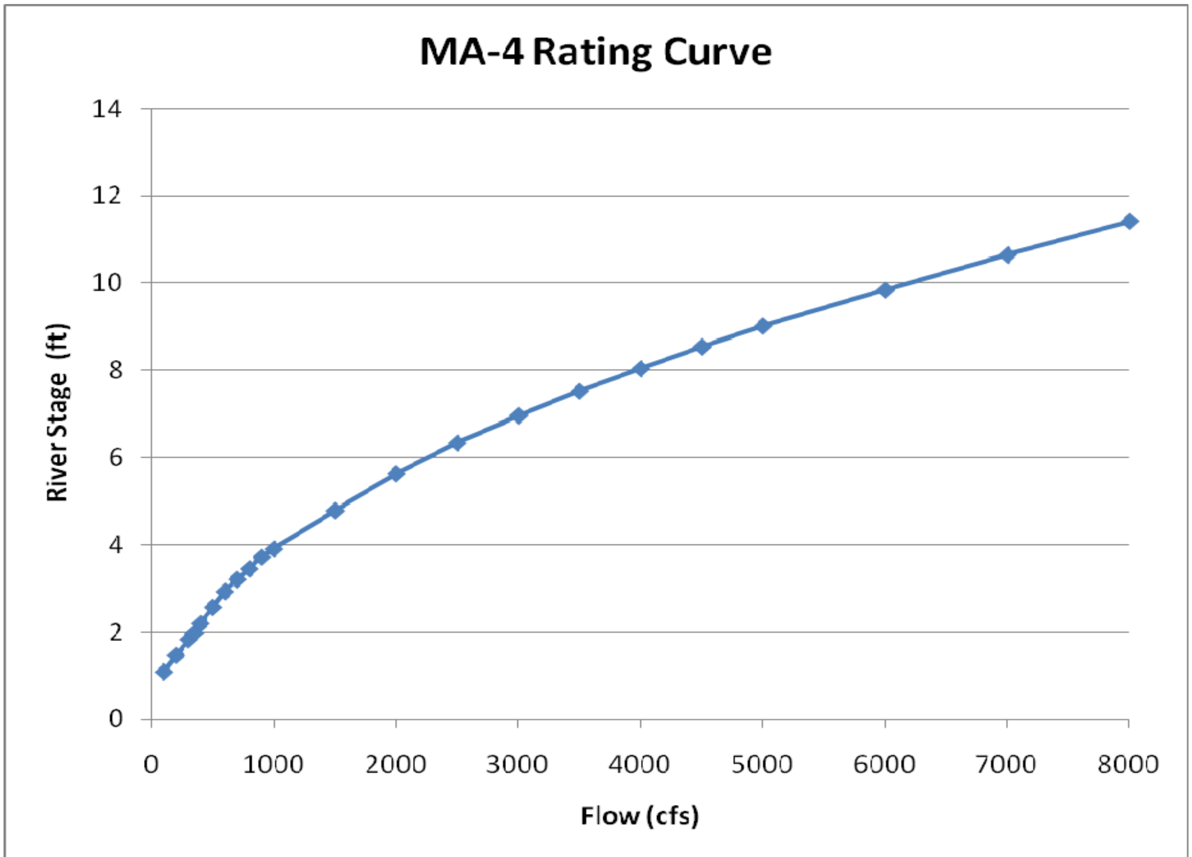
4000
5000
6000
7000
8000


MA-4 Rating Curve
River Stage (ft)
Flow (cfs)
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2
4
6
8
10
12
14
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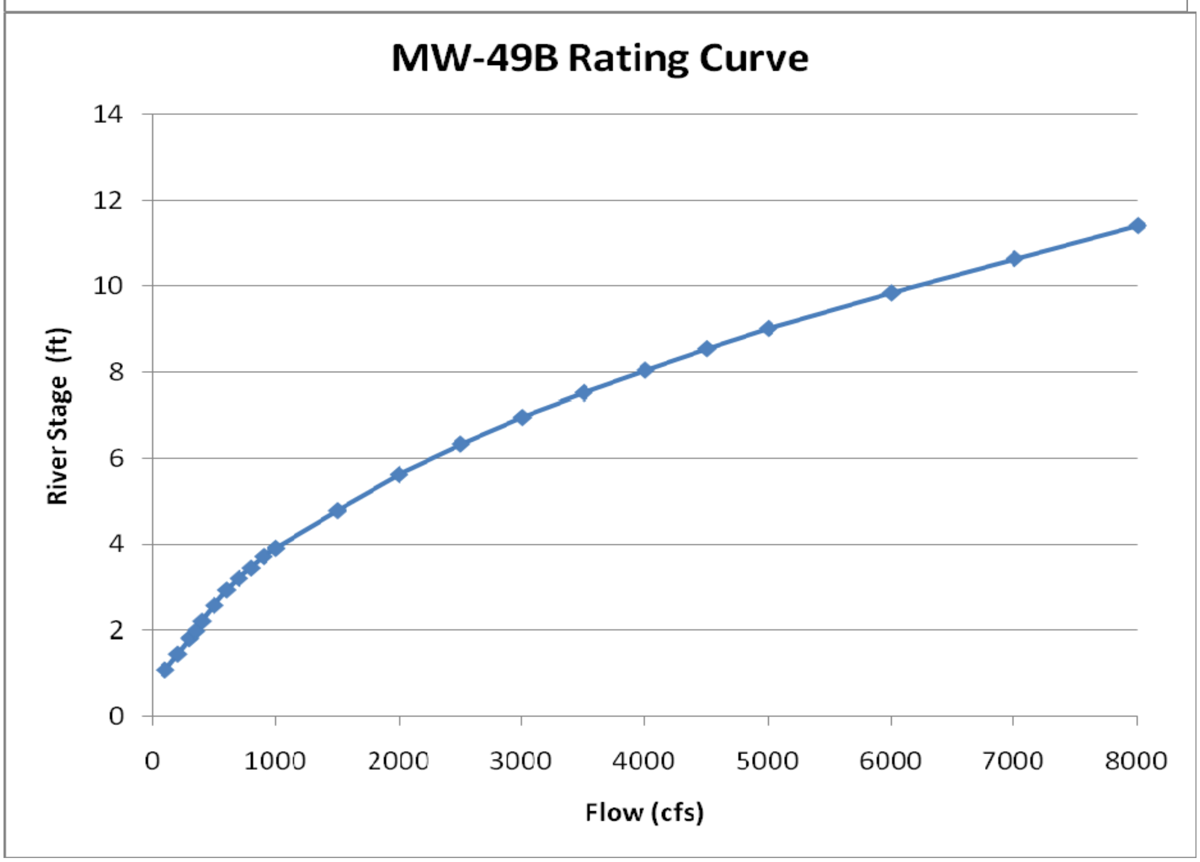
1000
2000
3000
4000
5000
6000
7000
8000


MW-49B Rating Curve
River Stage (ft)
Flow (cfs)
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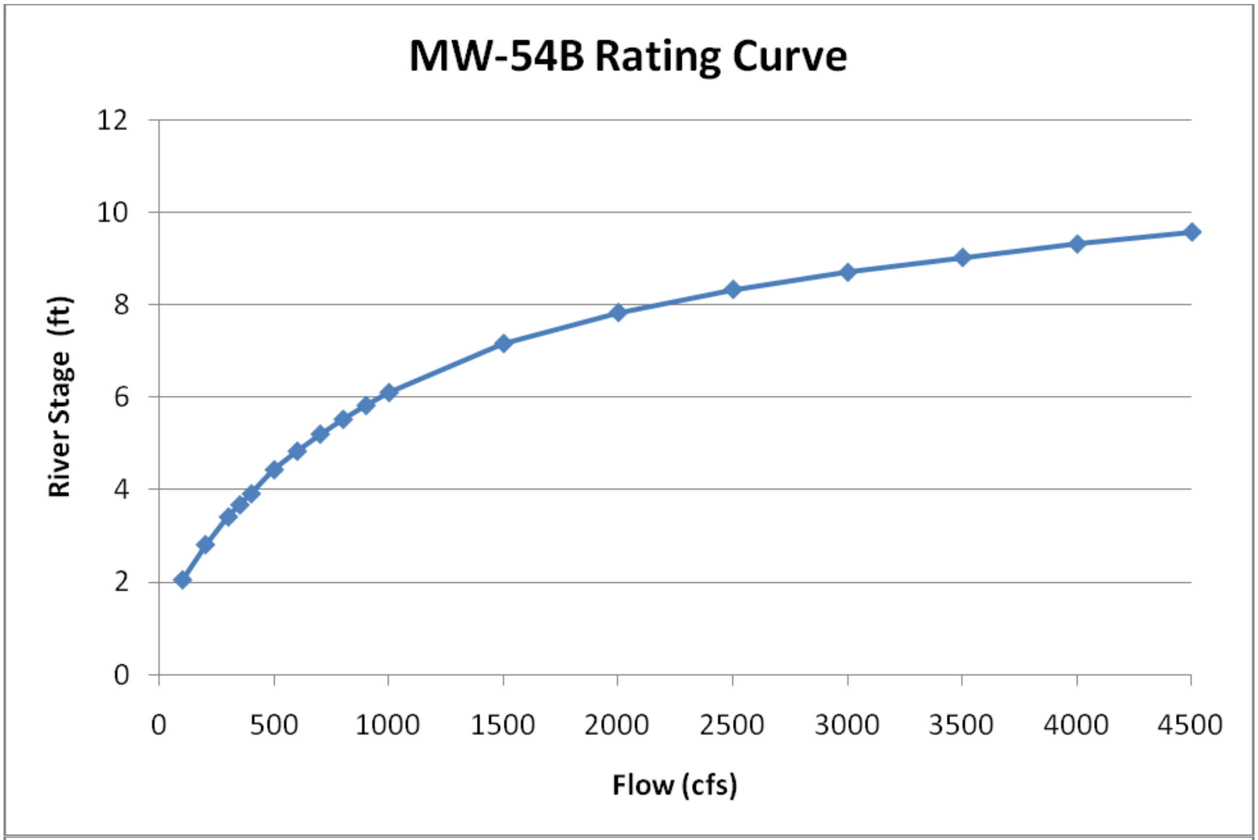
4
6
8
10
12
14
0
1000
2000
3000
4000
5000
6000
7000
8000


MW-54B Rating Curve
River Stage (ft)
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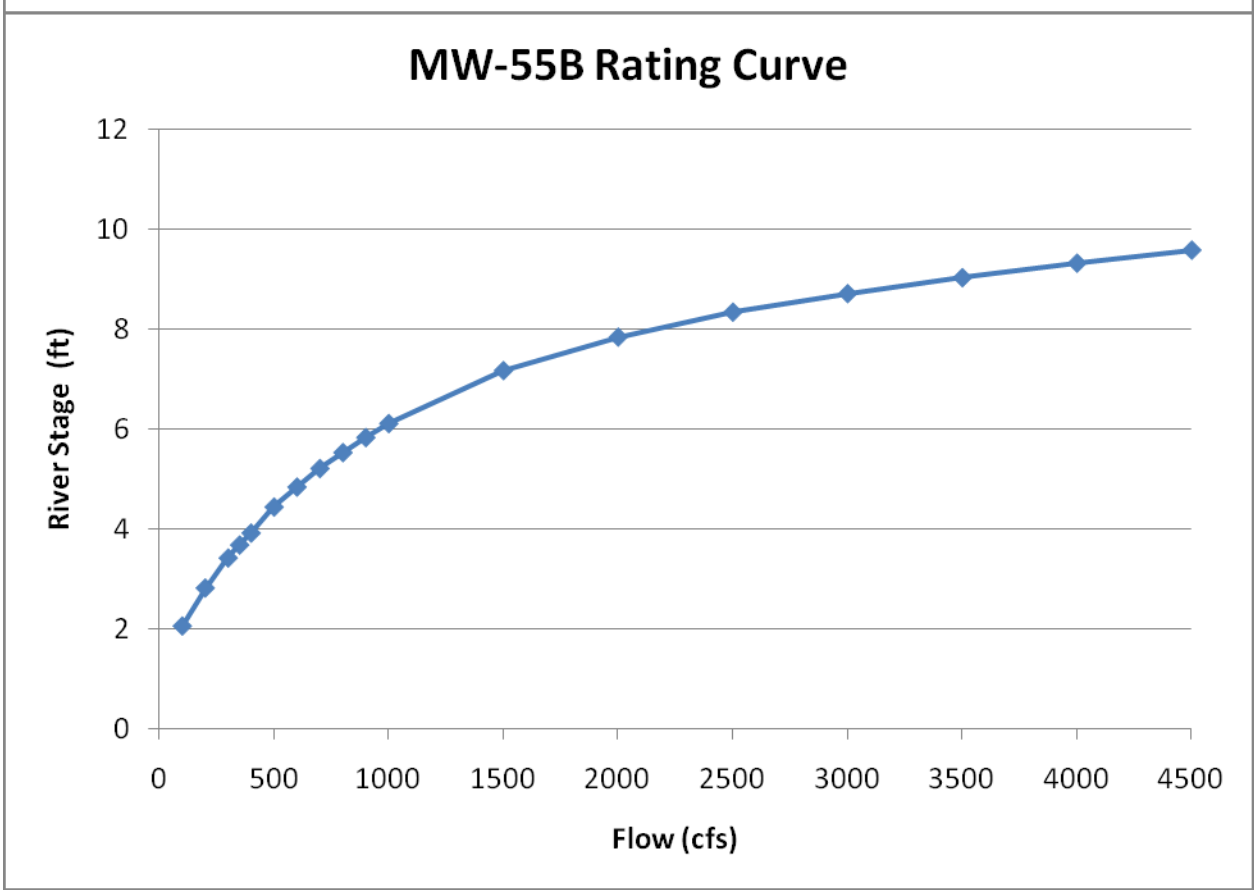
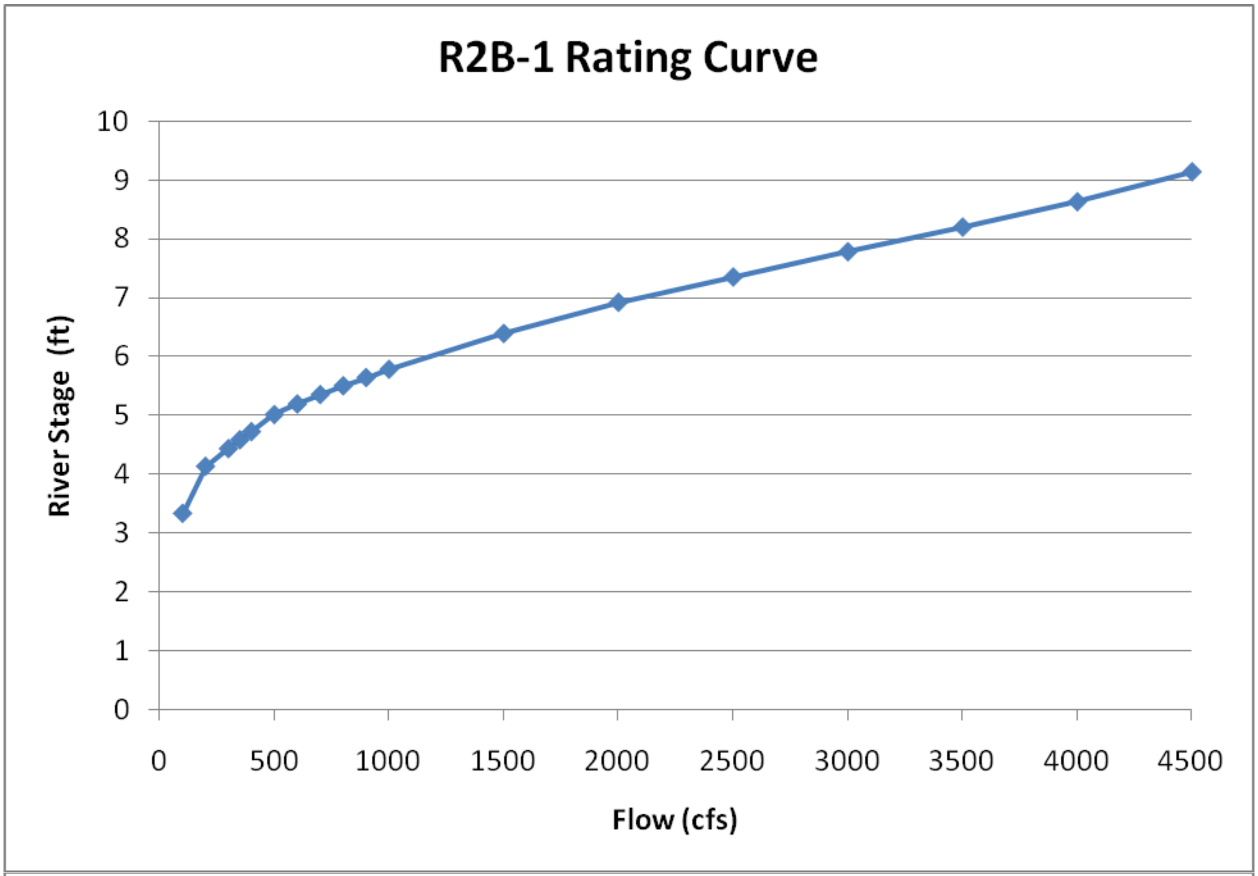
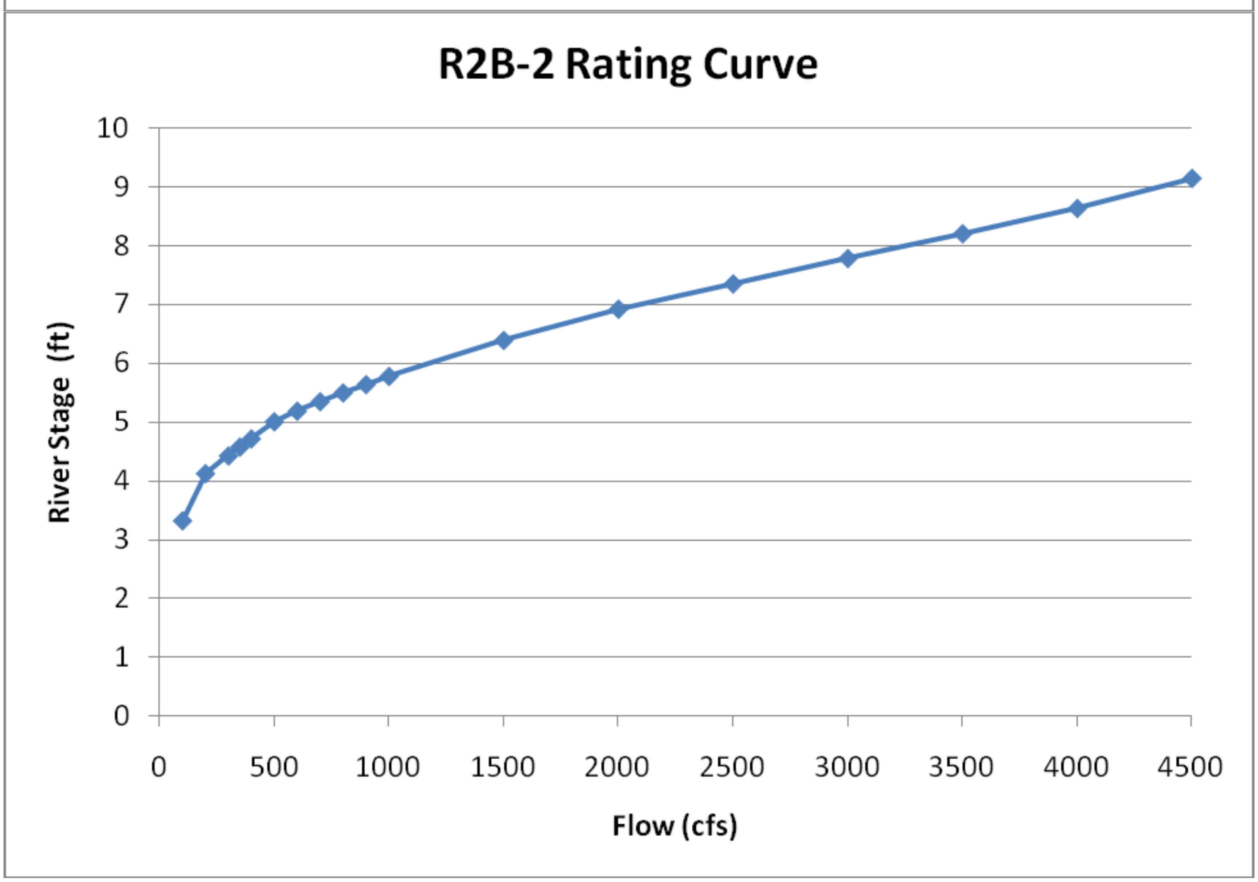
8
10
12
0
500
1000
1500
2000
2500
3000
3500
4000
4500
Flow (cfs)


MW-55B Rating Curve
River Stage (ft)
0
2
4
6
8
10
12
0
500
1000
1500
2000
2500
3000
3500
4000
4500
Flow (cfs)


R2B-1 Rating Curve
River Stage (ft)
Flow (cfs)
0
1
2
3
4
5
6
7
8
9
10
0
500
1000
1500
2000
2500
3000
3500
4000
4500


R2B-2 Rating Curve
River Stage (ft)
Flow (cfs)
0
1
2
3
4
5
6
7
8
9
10
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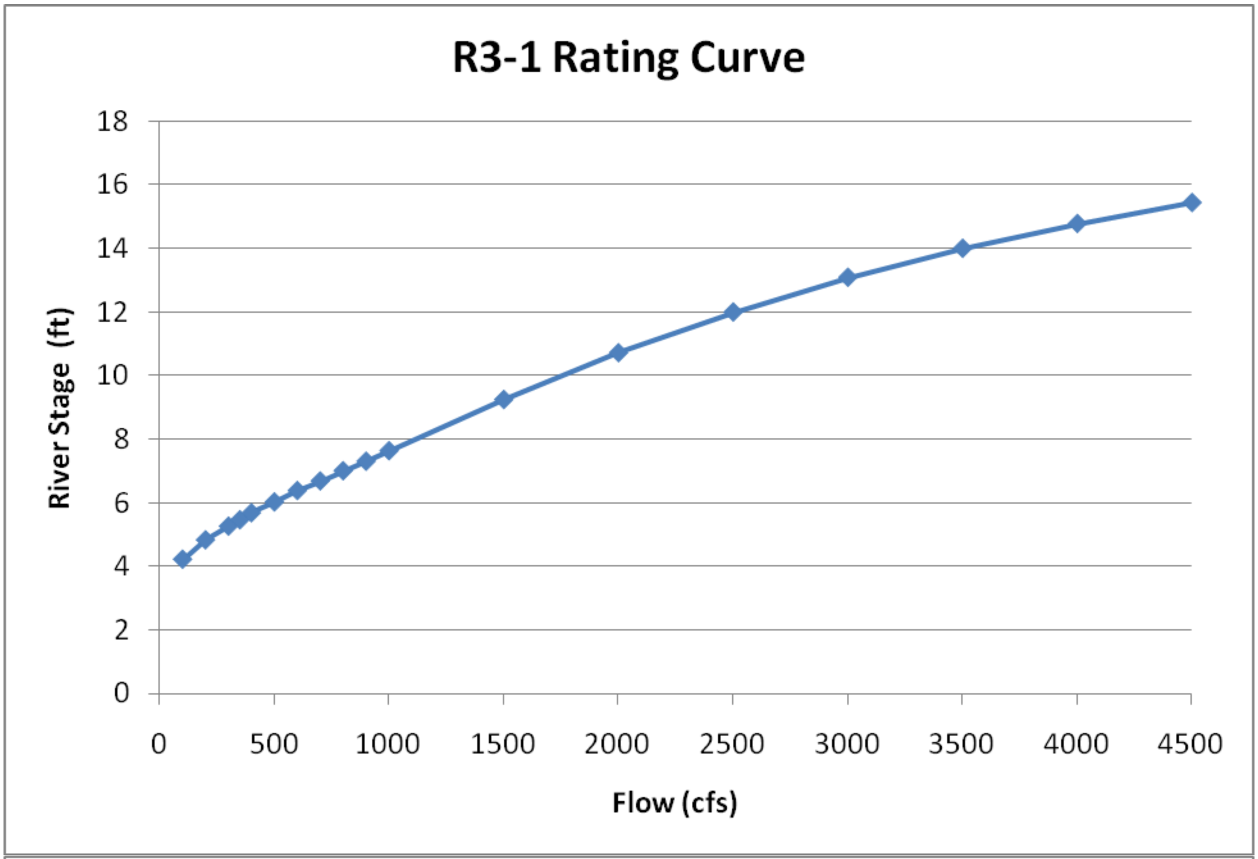
1000
1500
2000
2500
3000
3500
4000
4500


R3-1 Rating Curve
River Stage (ft)
18
16
14
12
10
8
6
4
2
0
0
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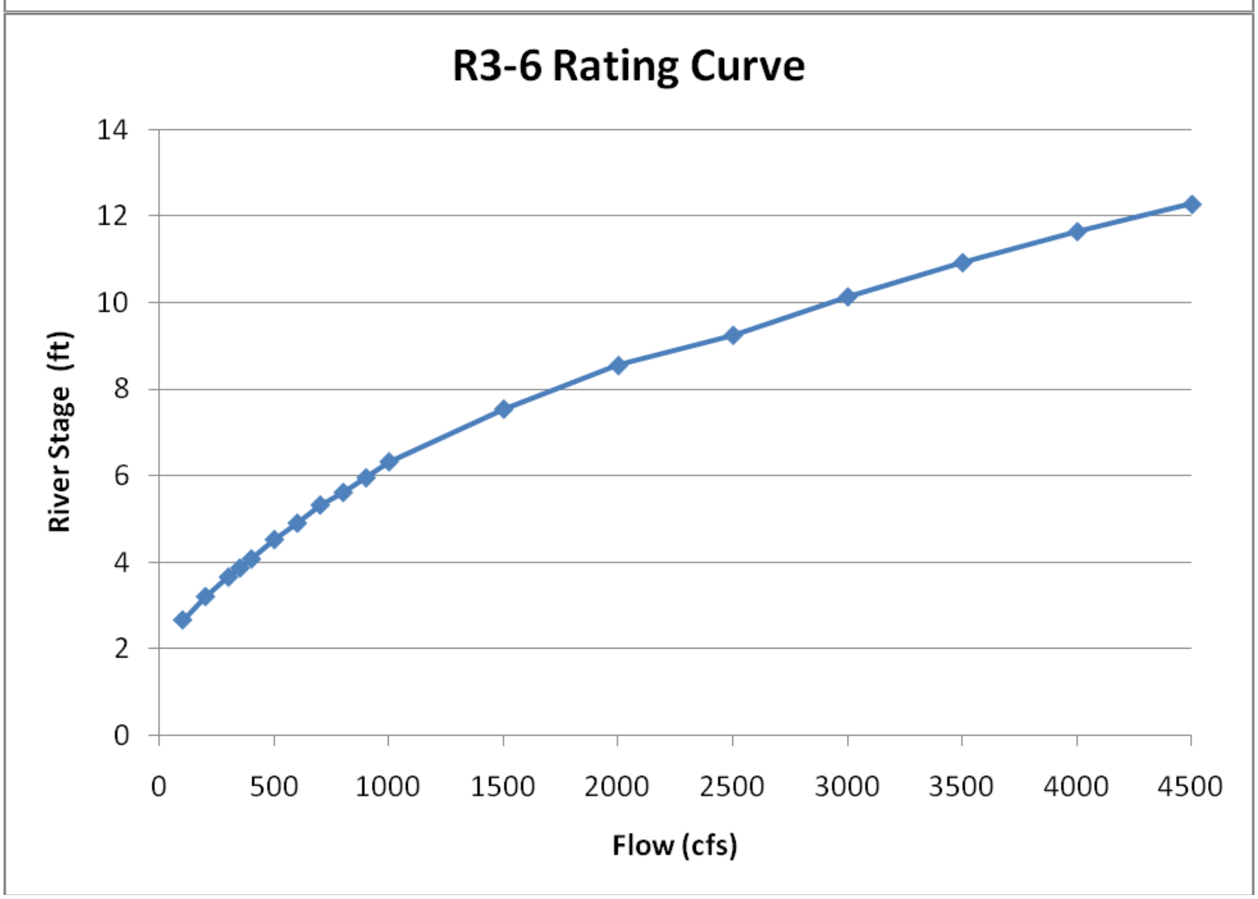
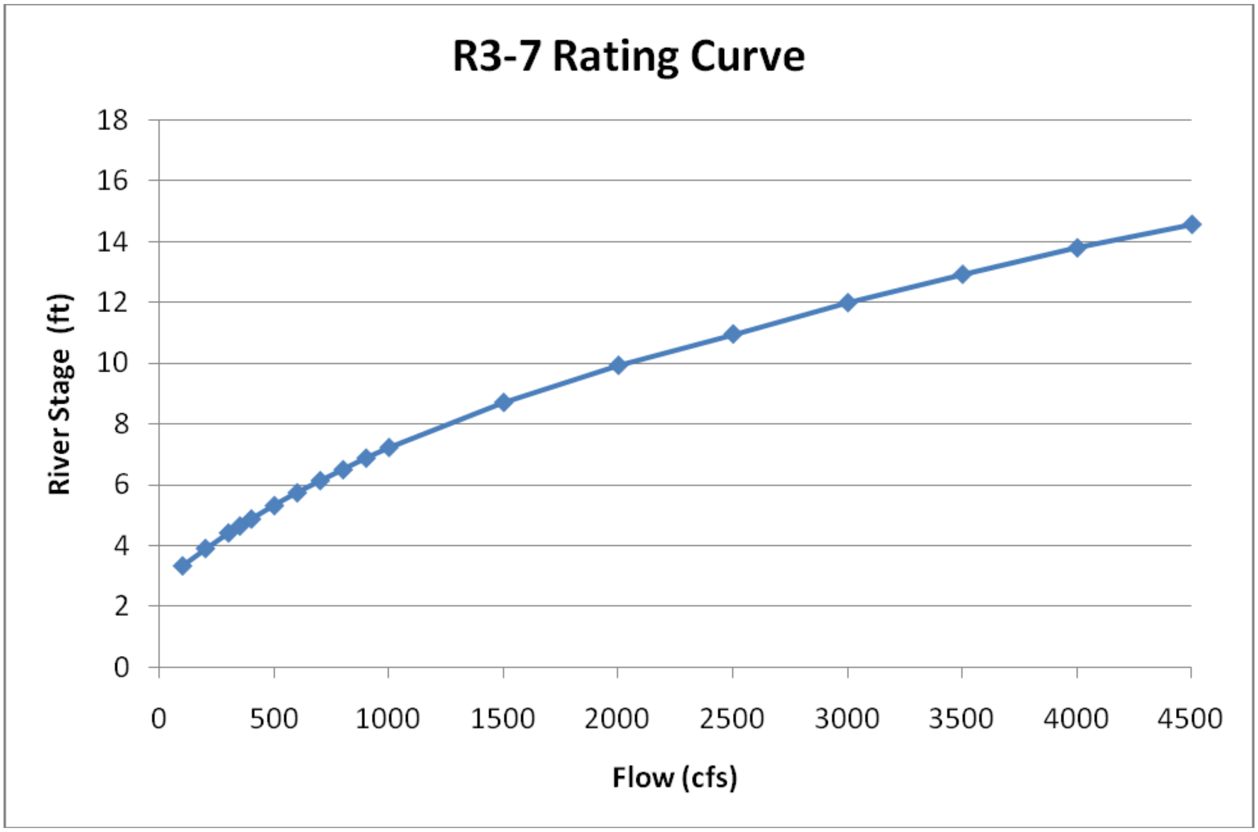
1000
1500
2000
2500
3000
3500
4000
4500
Flow (cfs)


R3-6 Rating Curve
River Stage (ft)
14
12
10
8
6
4
2
0
0
500
1000
1500
2000
2500
3000
3500
4000
4500
Flow (cfs)


R3-7 Rating Curve
River Stage (ft)
Flow (cfs)
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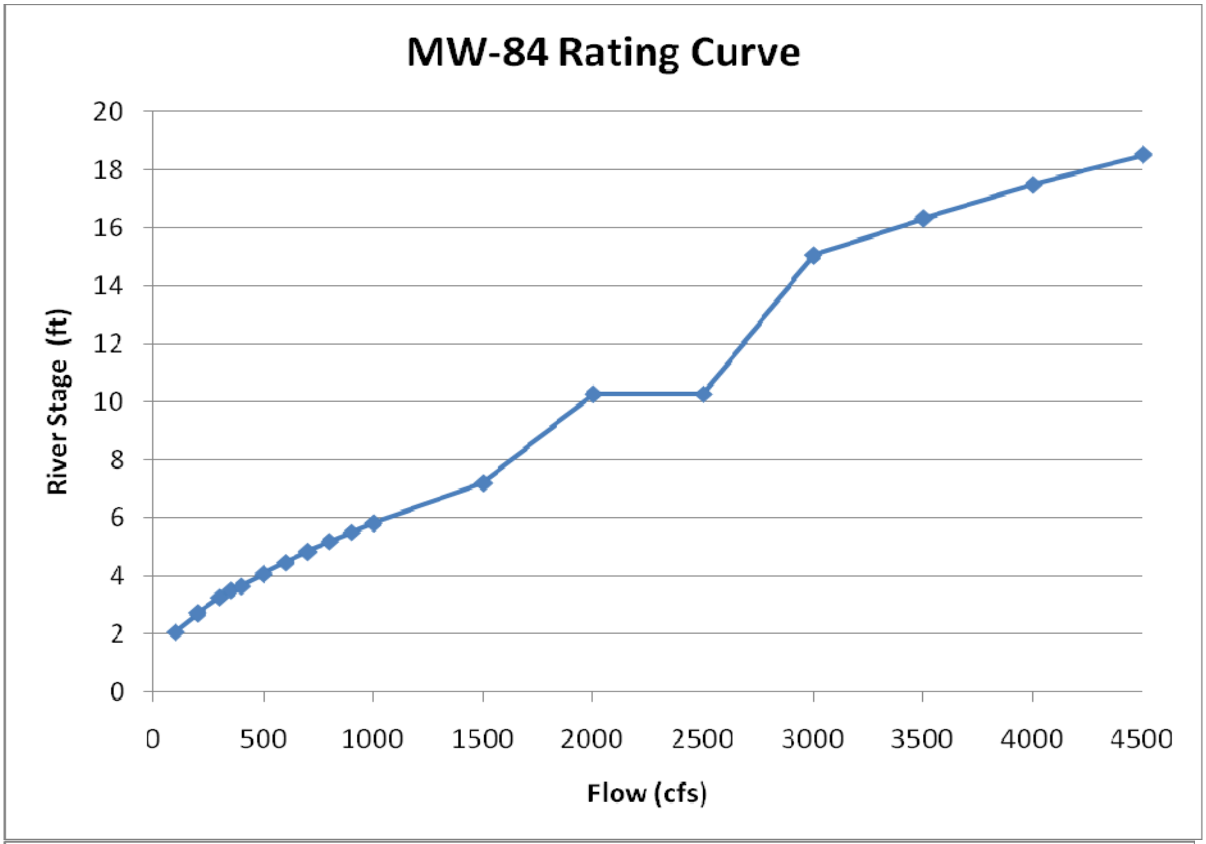
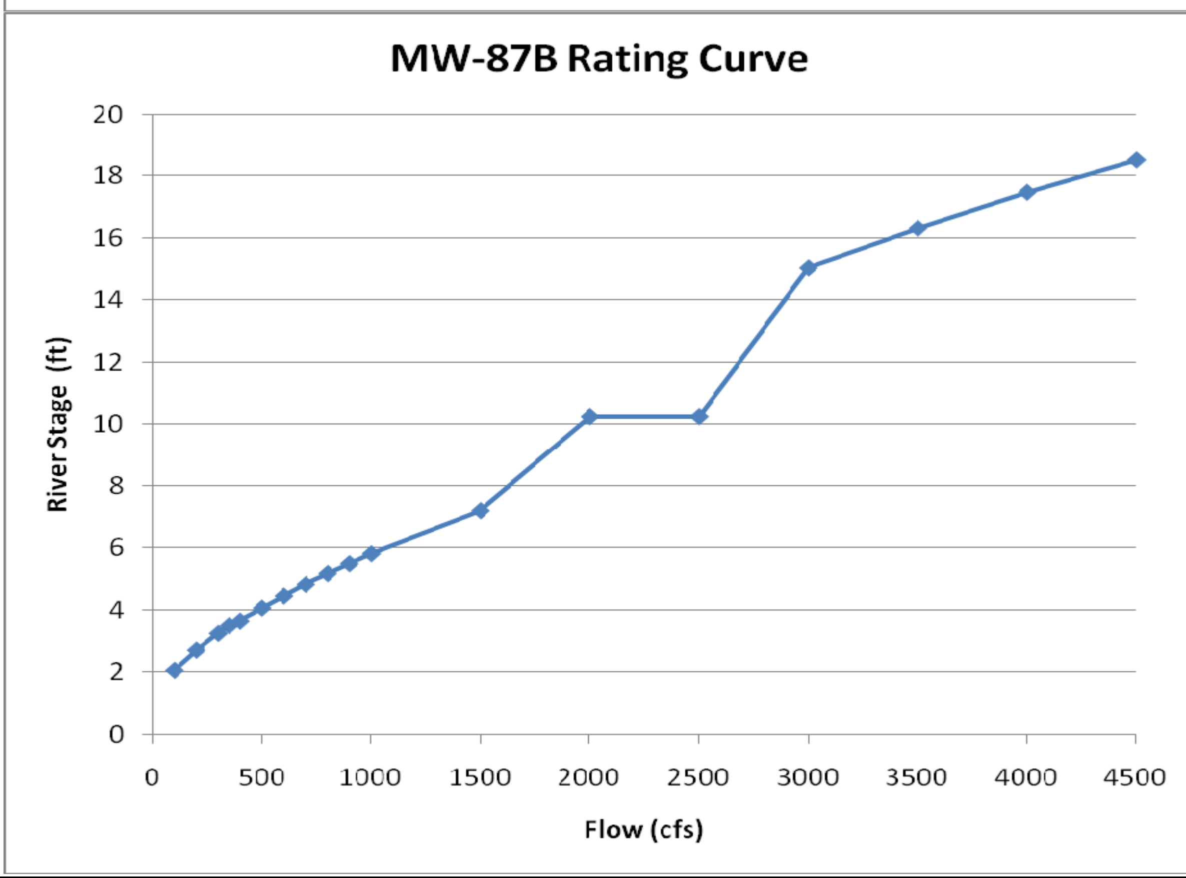
4
6
8
10
12
14
16
18
0
500
1000
1500
2000
2500
3000
3500
4000
4500


MW-84 Rating Curve
River Stage (ft)
Flow (cfs)
0 2 4 6 8 10 12 14 16 18 20
0 500 1000 1500 2000 2500 3000 3500 4000 4500


MW-87B Rating Curve
River Stage (ft)
Flow (cfs)
0 2 4 6 8 10 12 14 16 18 20
0 500 1000 1500 2000 2500 3000 3500 4000 4500

SJRRP Flow Bench Evaluation

March 16, 2010

Flows below Friant Dam will increase to 800 cfs on March 16, 2010 based on the Restoration Administrator 2010 Interim Flow Recommendations for the San Joaquin River Restoration Program, February 1 through December 1, 2010. The evaluation of the increase is shown below.

As of March 15, 2010, Reclamation personnel have reported the following:

1. Flows are below known conveyance thresholds (8,000 cfs in Reach 2A, 1,300 cfs in Reach 2B, and 1,300 cfs in Reach 3) based on preliminary real-time data.
2. Mendota Pool operations calls did not identify groundwater seepage or flow problems.
3. The seepage hotline received two calls, on March 4th regarding R2B-1, and on March 11th regarding an airstrip near river mile 238.5. Both site evaluations determined the planned releases could proceed.
4. Real-time groundwater in Reach 2B and 3 has not risen above identified groundwater level thresholds based on preliminary data.
5. Manually monitored groundwater wells do not show groundwater levels above identified thresholds, with the exception of wells R2B-1 and MW-49B. R2B-1 shows a depth below ground surface of 5.58 ft, with groundwater levels stabilizing (buffer 4-6 feet). The groundwater in MW-49B was measured at 5.79 feet below ground surface (buffer 4-6 feet).
6. Measured losses in Reach 2A are around 160 cfs, but have not yet stabilized.
7. Projected groundwater levels from the upcoming increase in flow are below monitoring thresholds except for wells R2B-1, MW-49B, and MW-55B. R2B-1 shows a predicted depth below ground surface of 4.8 ft (buffer 4-6 feet). MW-49B shows a predicted depth of 4.7 feet (buffer 4-6 feet). MW-55B shows a predicted depth of 6.8 feet (buffer 6-8 feet).
8. No problems have been reported from the LSJLD and they were notified of potential increase or continuance in flows and identified no potential issues.
9. No problems have been reported from CCID or SLCC and they were notified of potential increase or continuance in flows and identified no potential issues.

A seepage hotline call was placed on March 4, 2010 regarding well R2B-1 and a site evaluation was conducted with Reclamation, Columbia Canal Company, and Paramount Farms representatives the same day. The evaluation determined that the planned releases could proceed with close monitoring.

Another seepage hotline call was placed on March 11, 2010 regarding an airstrip near river mile 238.5. A site evaluation was conducted on March 15, 2010. Reclamation will install and monitor two temporary piezometers on the site to verify water level observations and estimate the extent of seepage under the orchard. The evaluation determined that planned releases could proceed.

A third seepage hotline call was placed on March 15, 2010 regarding concerns for future seepage impacts at Fort Washington Beach campground. There are no immediate problems – the call identified issues at 1100 cfs and above. Planned 800 cfs release can occur.

Monitoring Well 49B is in Reach 2A, on the river side of the levee. It is currently within the buffer zone and is predicted to rise to 4.7 feet, which is still within its buffer zone of 4-6 feet. Due to the slope of the water table away from the river, and the short root depth of alfalfa, it is unlikely seepage impacts will occur in the adjacent alfalfa field. However, SJRRP will conduct a site investigation to confirm. The groundwater level is not predicted to exceed the top of the buffer zone. Planned releases can occur.

Monitoring Well 55B is at San Mateo Road. Although it is not currently in the buffer zone, a site investigation and evaluation is planned. The groundwater level is not predicted to exceed the top of the buffer zone. Planned releases can occur.

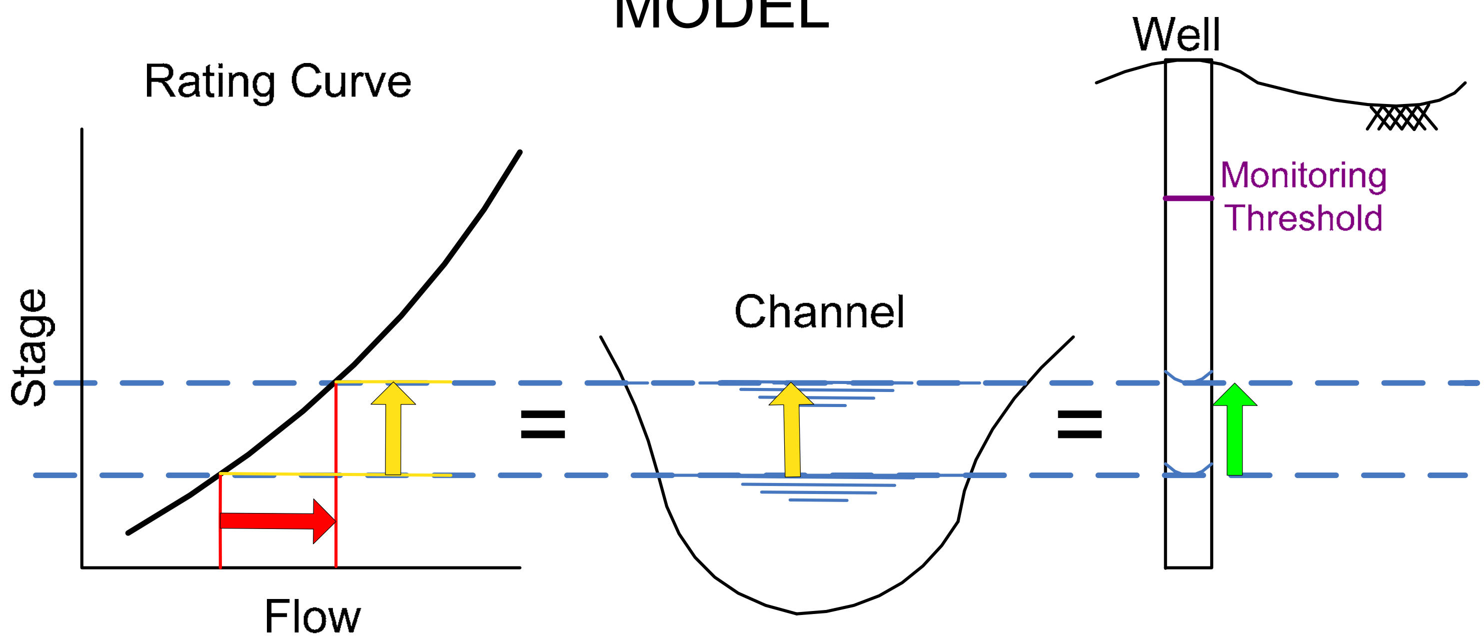
DATA:
Depth versus discharge rating curves along with Exhibit B assumptions and an estimated 300 cfs delivery to Arroyo Canal predicted new groundwater levels. Assumed changes in flows are:

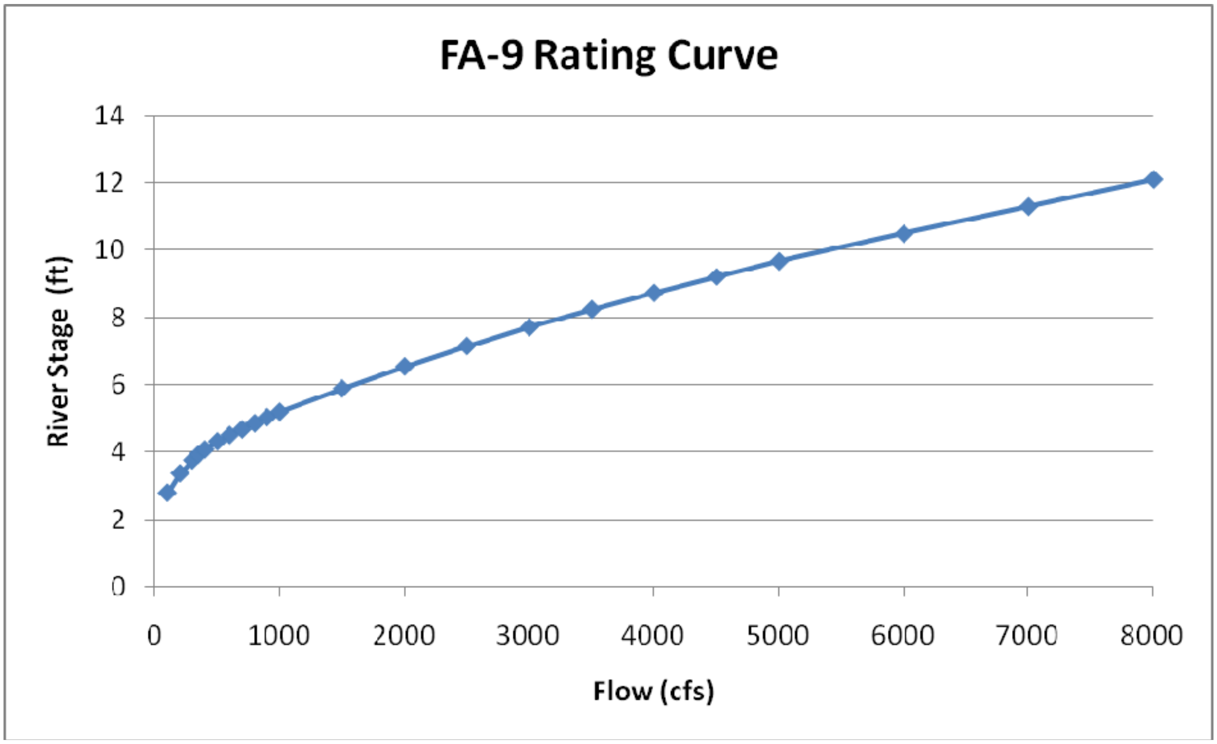
	Current Target (cfs)	Future Target (cfs)	Change (cfs)
Reach 2A	375	675	300
Reach 2B	255	555	300
Reach 3 and 4A	555	855	300

Manual measurements via electronic well sounder are taken weekly and provided along with recent flow data in the Weekly Groundwater Report, available at: http://restoresjr.net/activities/if/index.html. Table 1-1 shows the anticipated rise in groundwater. Subsequent pages contain the rating curves for each of these key wells from the TetraTech hydraulic model.

Table 1-1: Predicted Increases in Groundwater Level in Key Wells						
Well_ID	**Site**	**Buffer Zone (ft bgs)**	**Screen Depth (ft bgs)**	**Current GW Depth (ft bgs) as of week of 3/8/2010**	**Predicted Increase in Stage (ft)**	**Anticipated New GW Depth (ft)**
FA-9	Reach 2A – Transect 12 – Left	4-6	12-32	9.53	0.6325	8.9
MW-47	Reach 2A – Transect 12 – Right	6-8	20-40	8.94	0.6325	8.3
MA-4	Reach 2A – Transect 13 – Right	6-8	15-25	11.92	1.0475	10.9
MW-49B	Reach 2A – Transect 13 – Left	4-6	10-20	5.79	1.0475	4.7
MW-54B	Reach 2B – San Mateo Ave. – Right	TBD	TBD	17.2	1.51	15.7
MW-55B	Reach 2B – San Mateo Ave. – Left	6-8	10-15	8.26	1.51	6.8
R2B-1	Reach 2B – Right	4-6	8-11	5.58	0.814	4.8
R2B-2	Reach 2B – Right	4-6	17-20	12.72	0.814	11.9
R3-1	Reach 3 – Right	4-6	9-24	9.63	0.947	8.7
R3-6	Reach 3 – Right	4-6	17-20	9.12	1.068	8.1
R3-7	Reach 3 – Right	3-5	17-20	7.72	1.158	6.6
MW-84	Reach 4A – Highway 152 – Right	4-6	32-52	36.42	1.0715	35.3
MW-87B	Reach 4A – Highway 152 - Left	4-6	TBD	>14 (dry)	1.0715	12.9 to dry

SEEPAGE EVALUATION CONCEPTUAL MODEL




FA-9 Rating Curve
River Stage (ft)
Flow (cfs)
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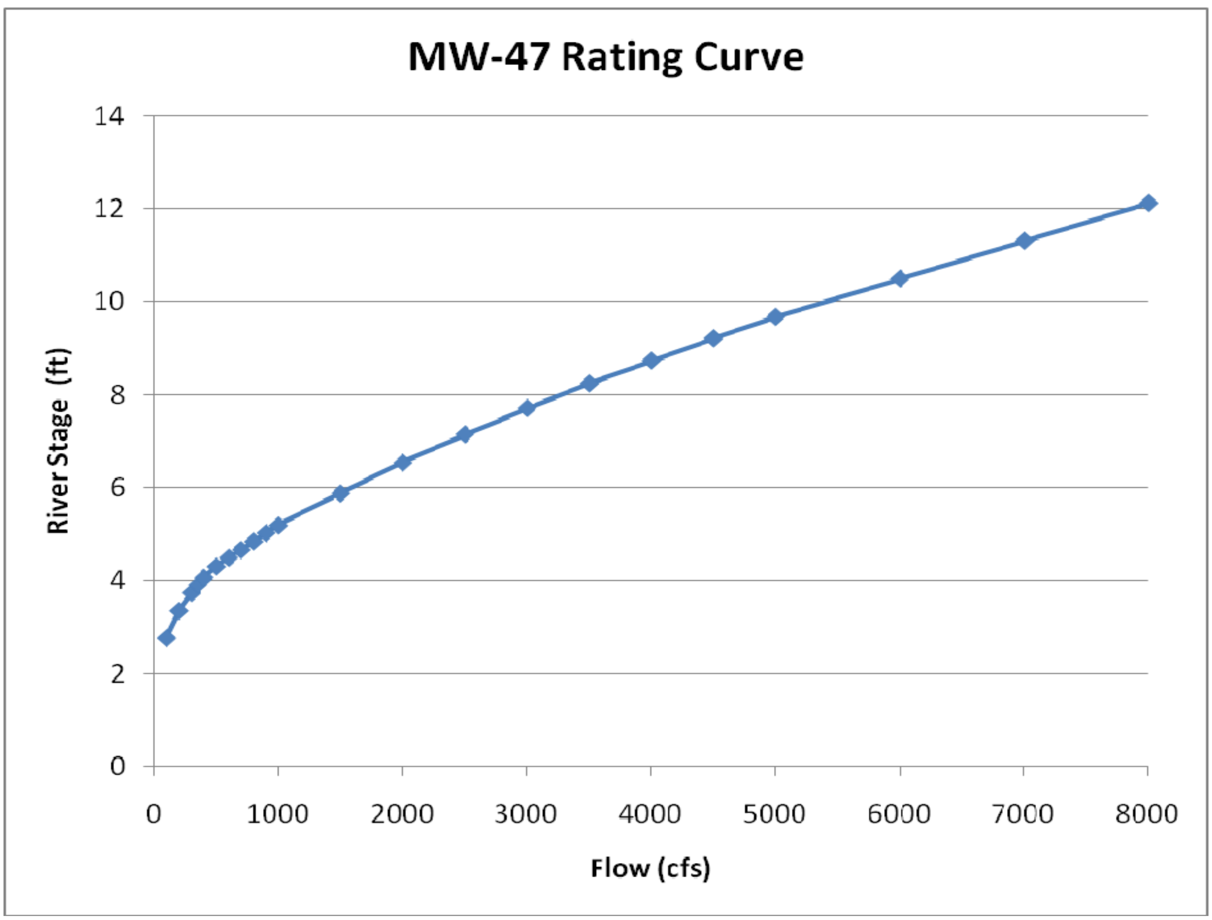
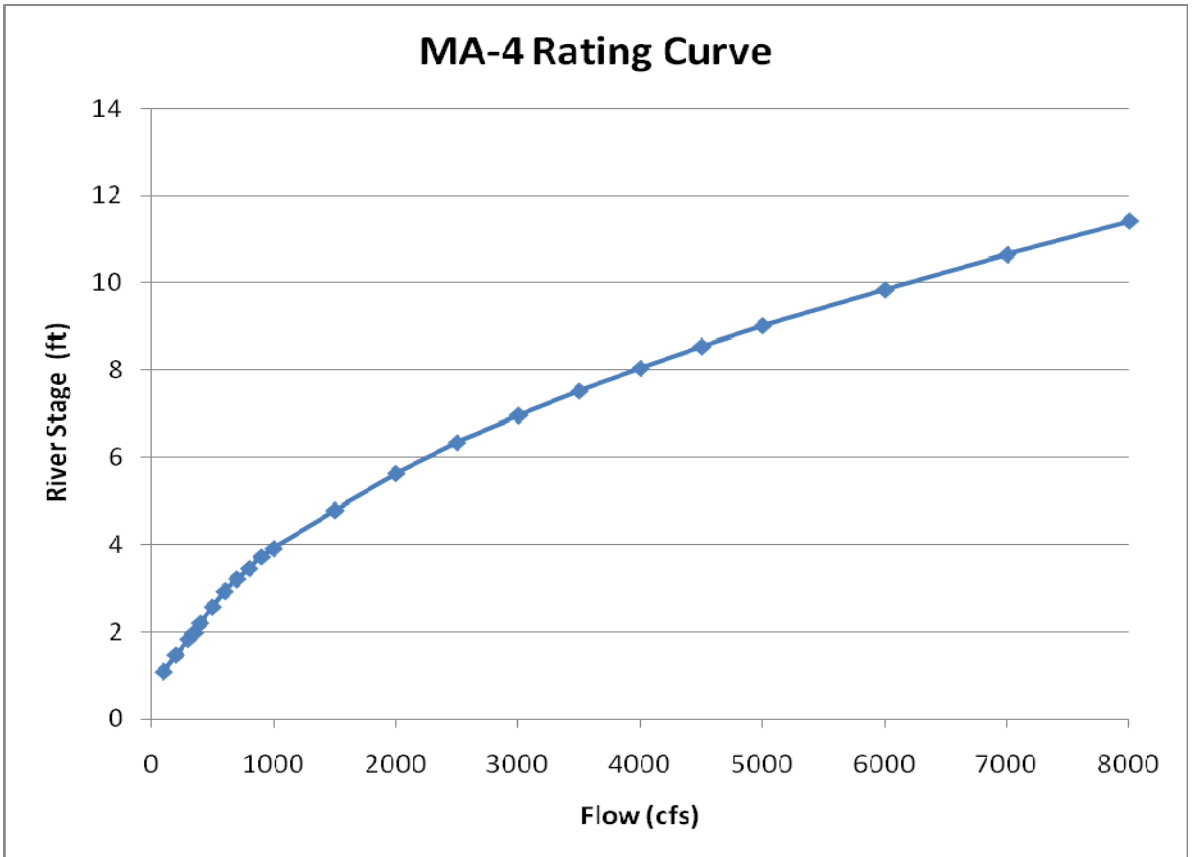
2
4
6
8
10
12
14
0
1000
2000
3000
4000
5000
6000
7000
8000


MW-47 Rating Curve
River Stage (ft)
Flow (cfs)
0
2
4
6
8
10
12
14
0
1000
2000
3000
4000
5000
6000
7000
8000


MA-4 Rating Curve
River Stage (ft)
0
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6
8
10
12
14
0
1000
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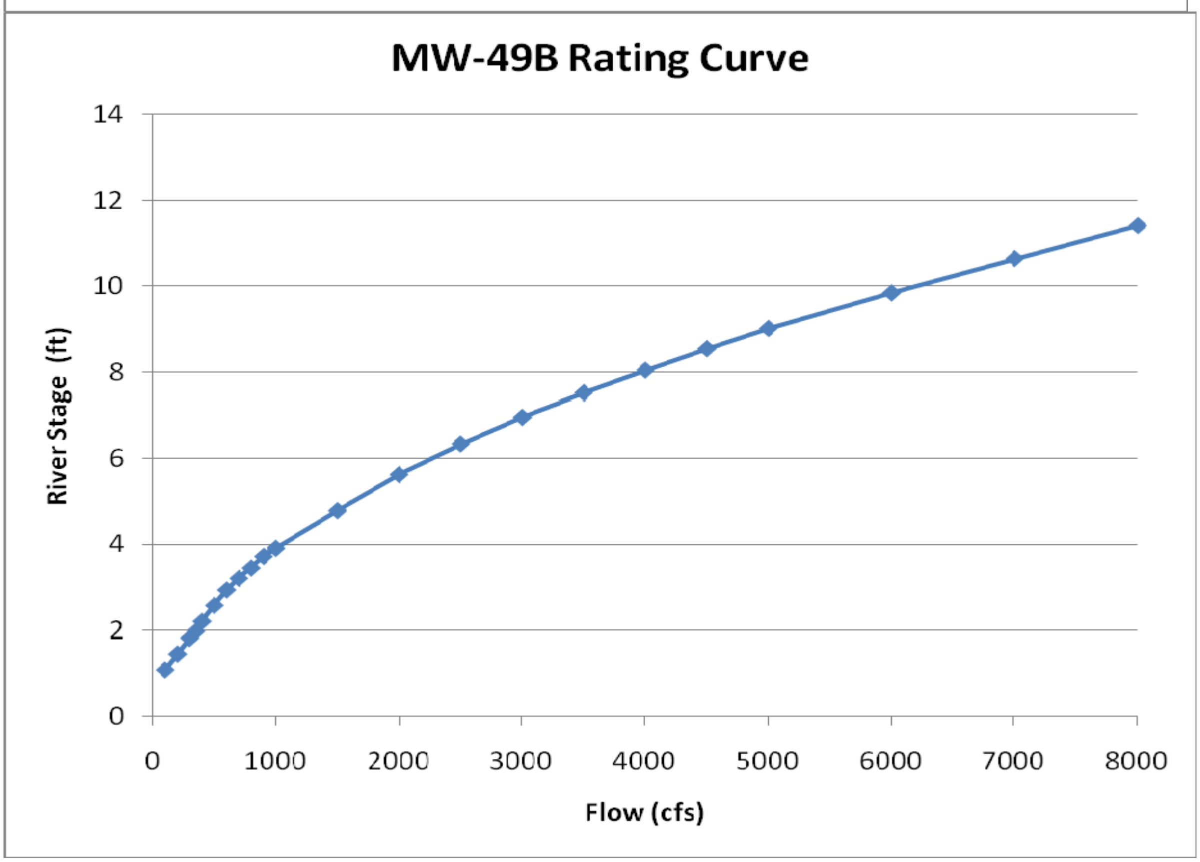
4000
5000
6000
7000
8000
Flow (cfs)


MW-49B Rating Curve
River Stage (ft)
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6
8
10
12
14
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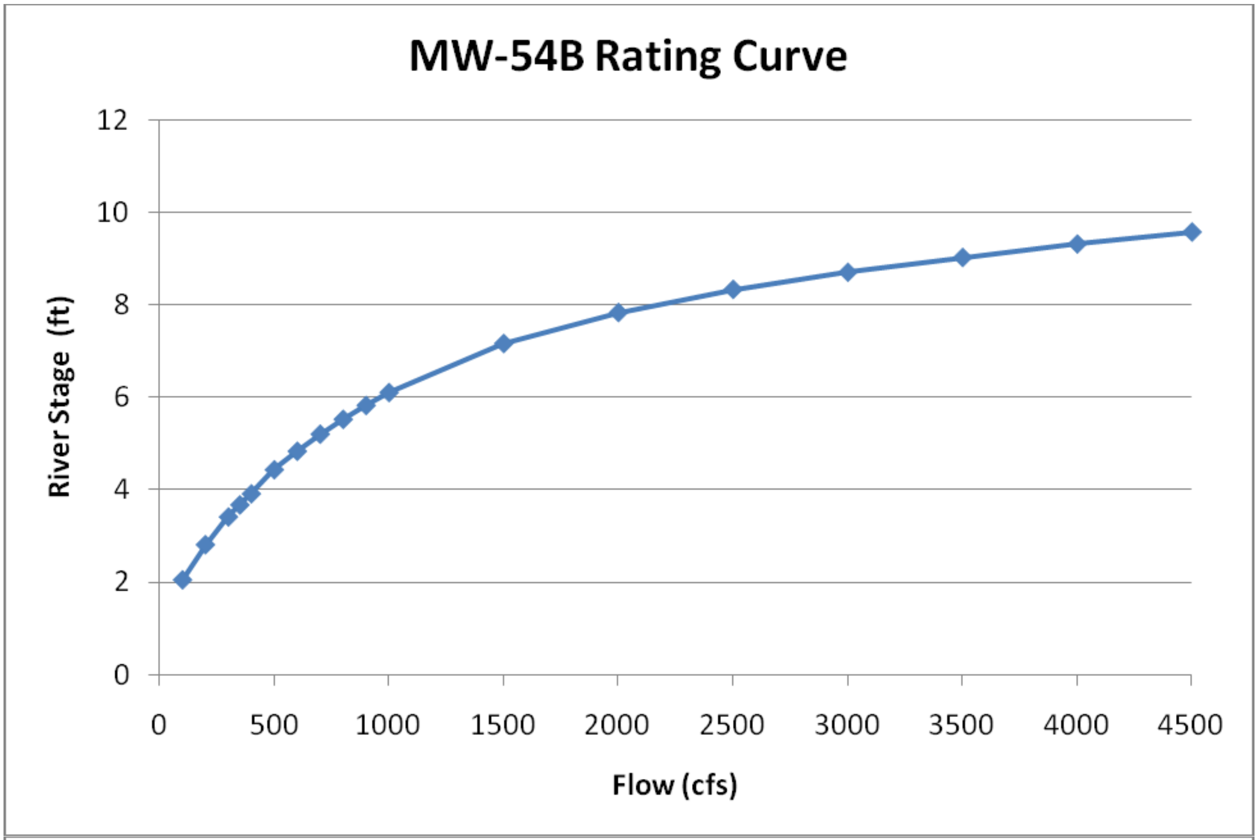
1000
2000
3000
4000
5000
6000
7000
8000
Flow (cfs)


MW-54B Rating Curve
River Stage (ft)
Flow (cfs)
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4
6
8
10
12
0
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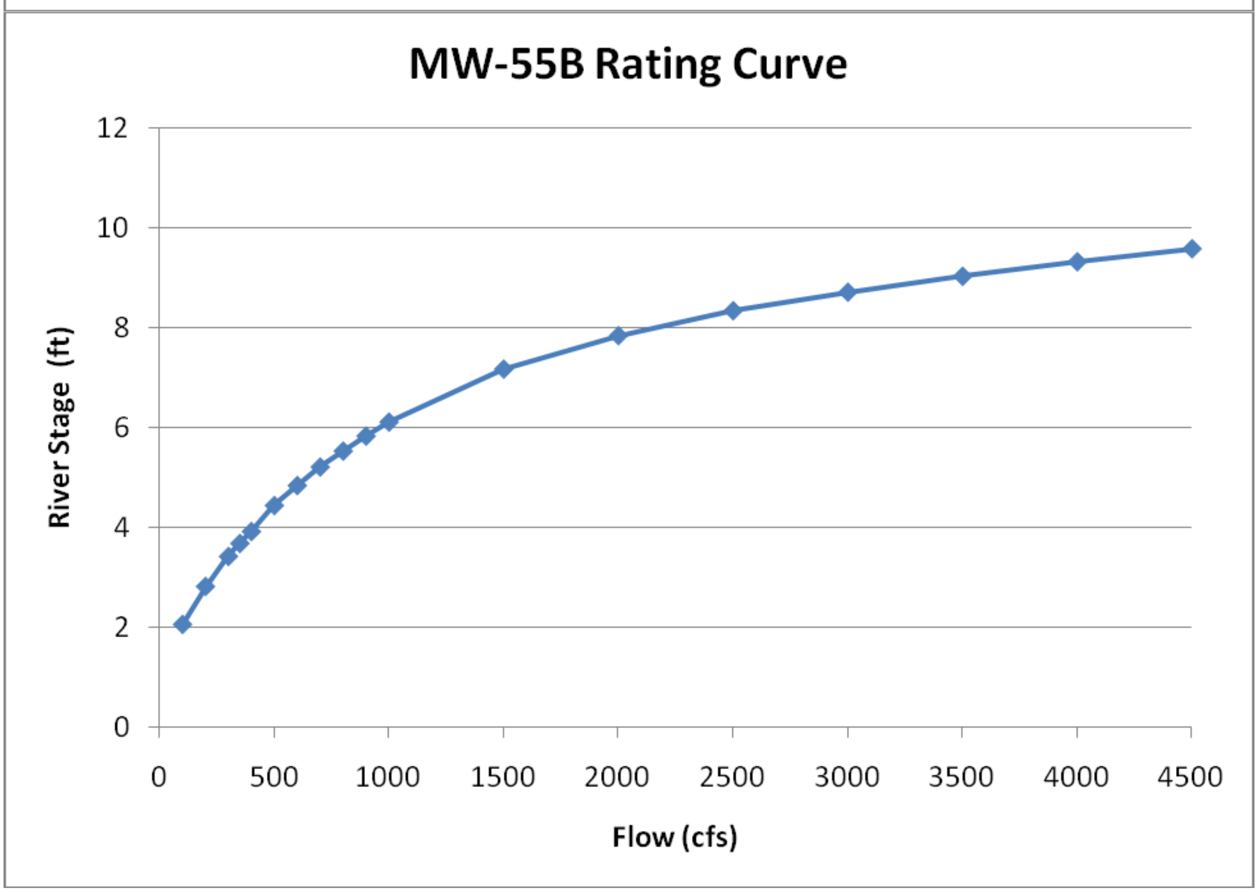
1000
1500
2000
2500
3000
3500
4000
4500


MW-55B Rating Curve
River Stage (ft)
Flow (cfs)
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4
6
8
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12
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1500
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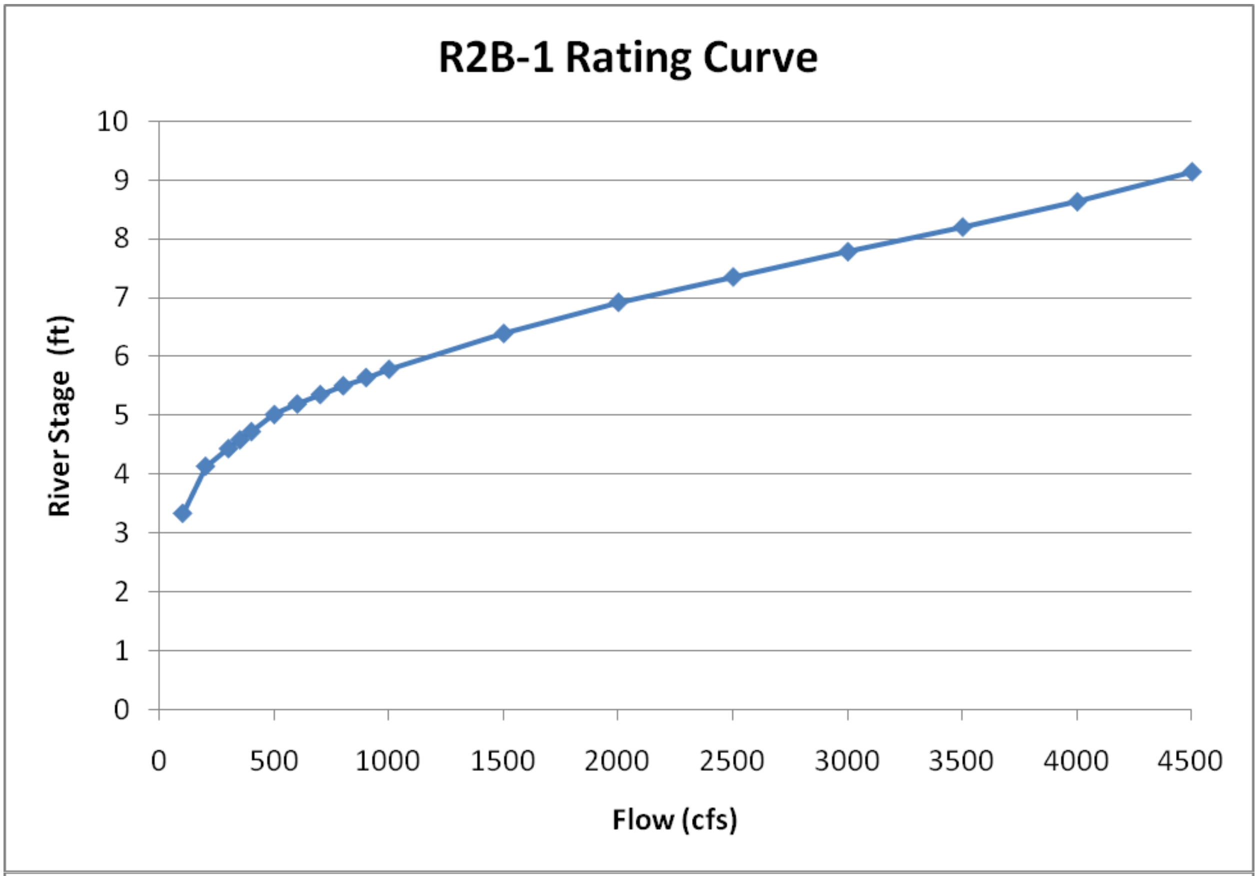
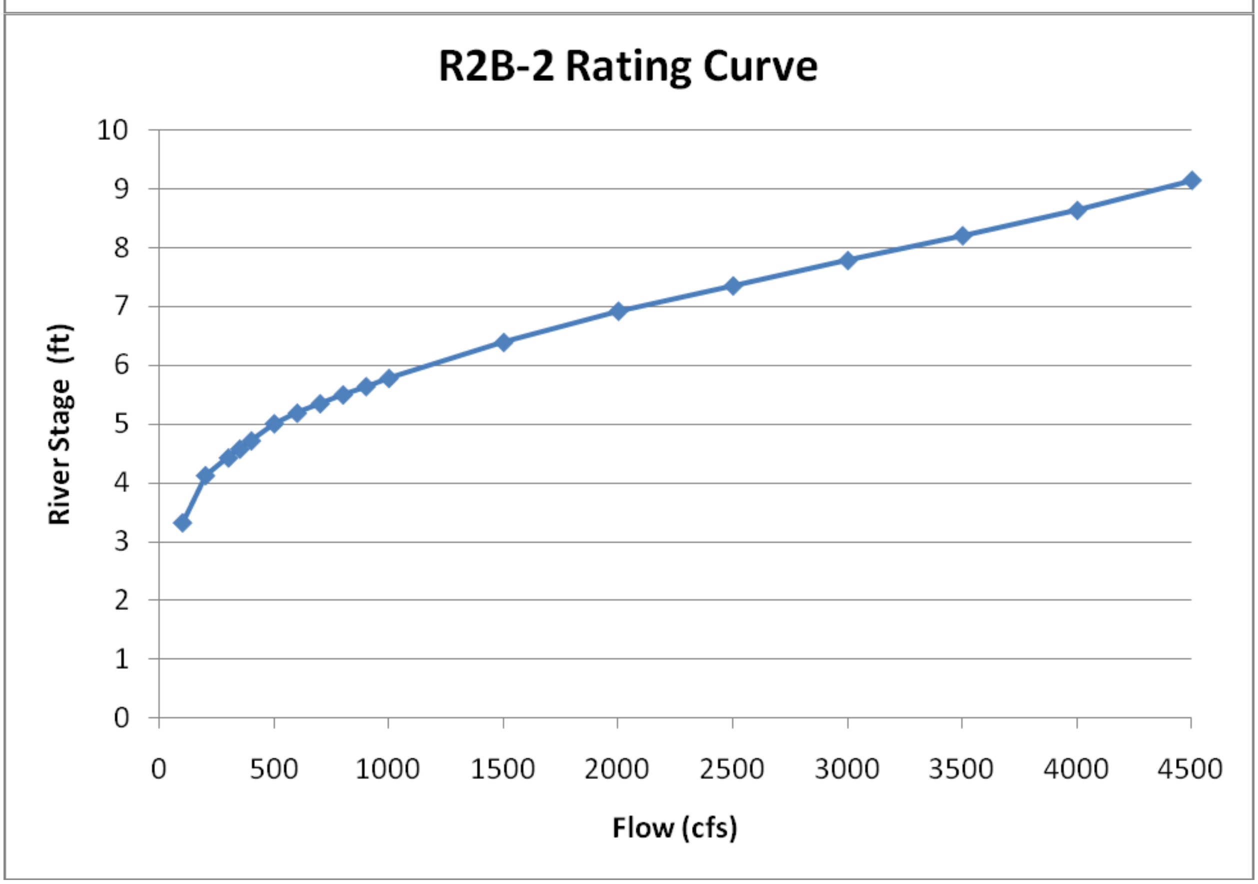
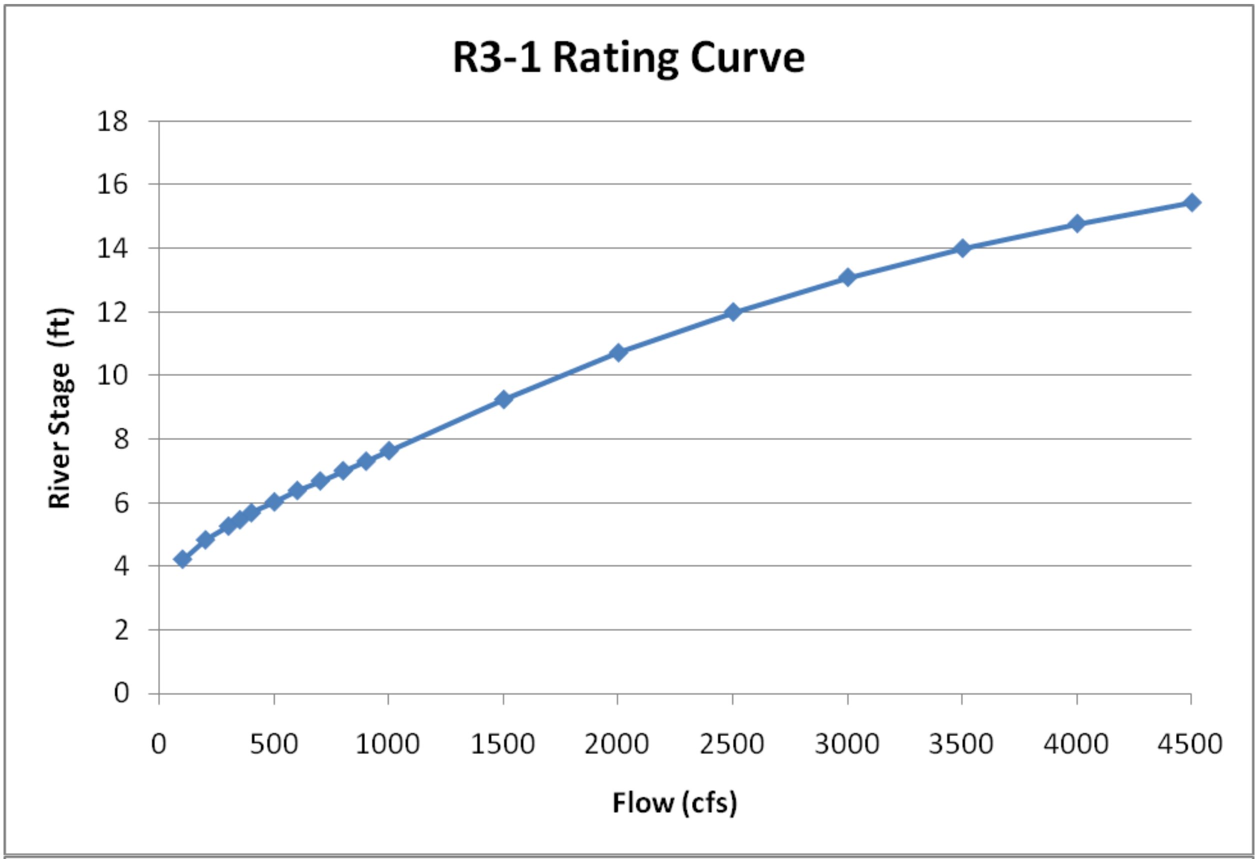
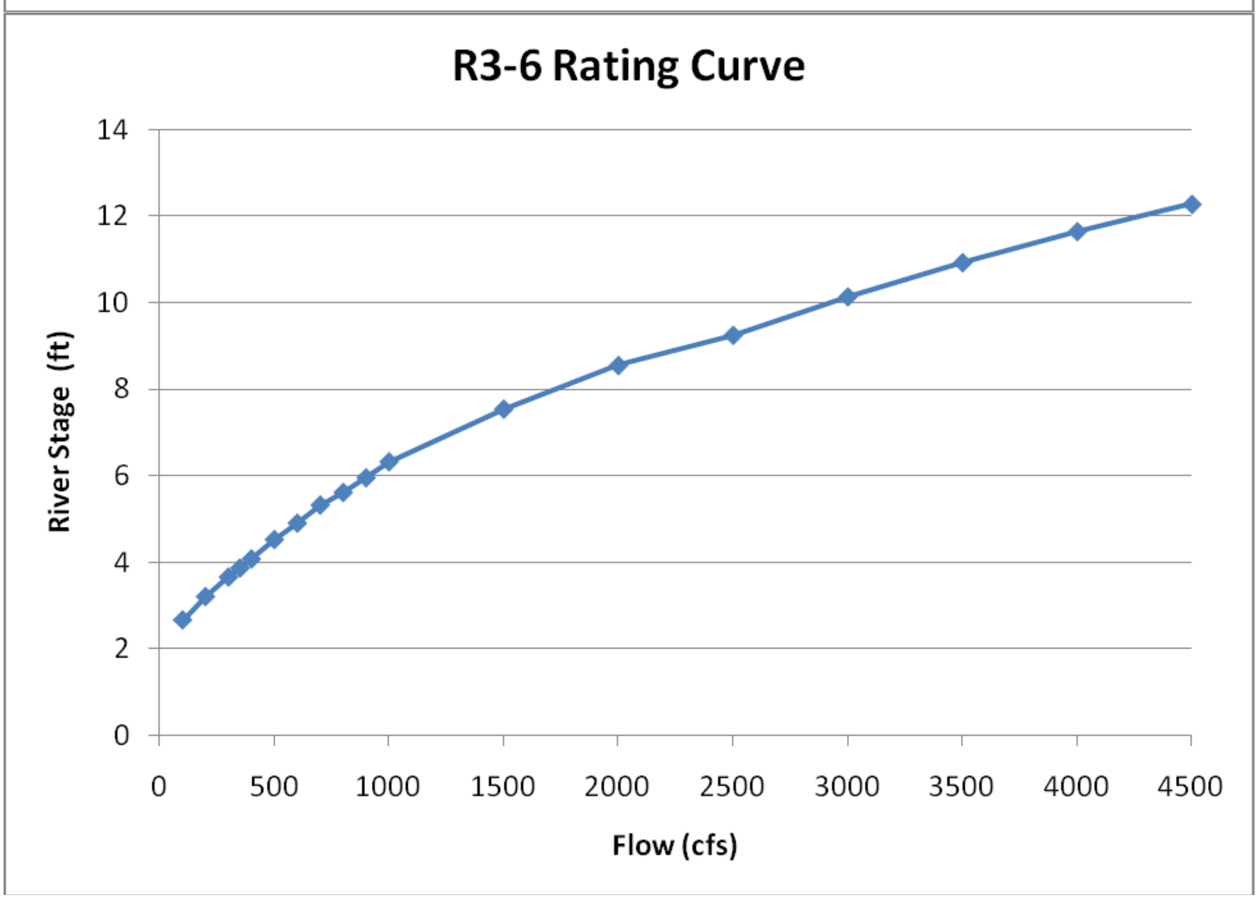
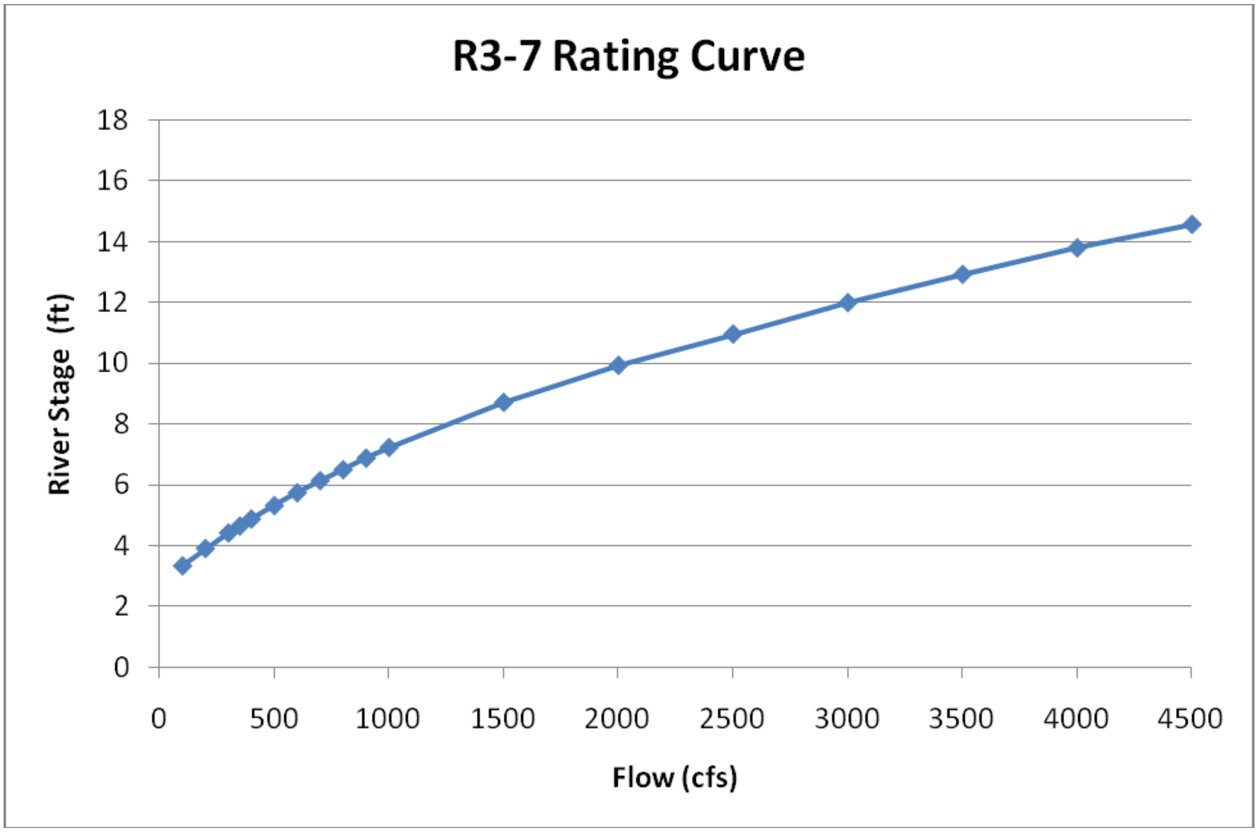
2500
3000
3500
4000
4500

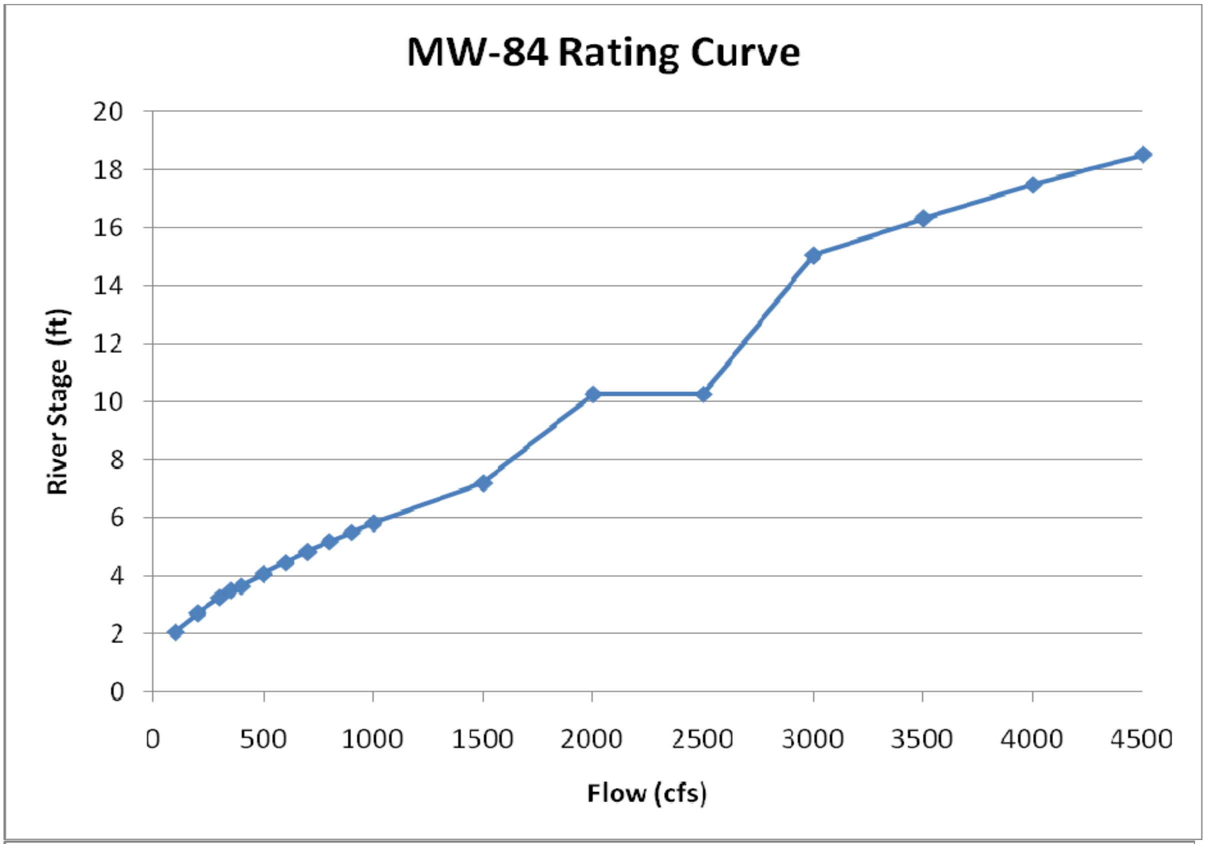

R2B-1 Rating Curve
River Stage (ft)
Flow (cfs)
0
1
2
3
4
5
6
7
8
9
10
0
500
1000
1500
2000
2500
3000
3500
4000
4500

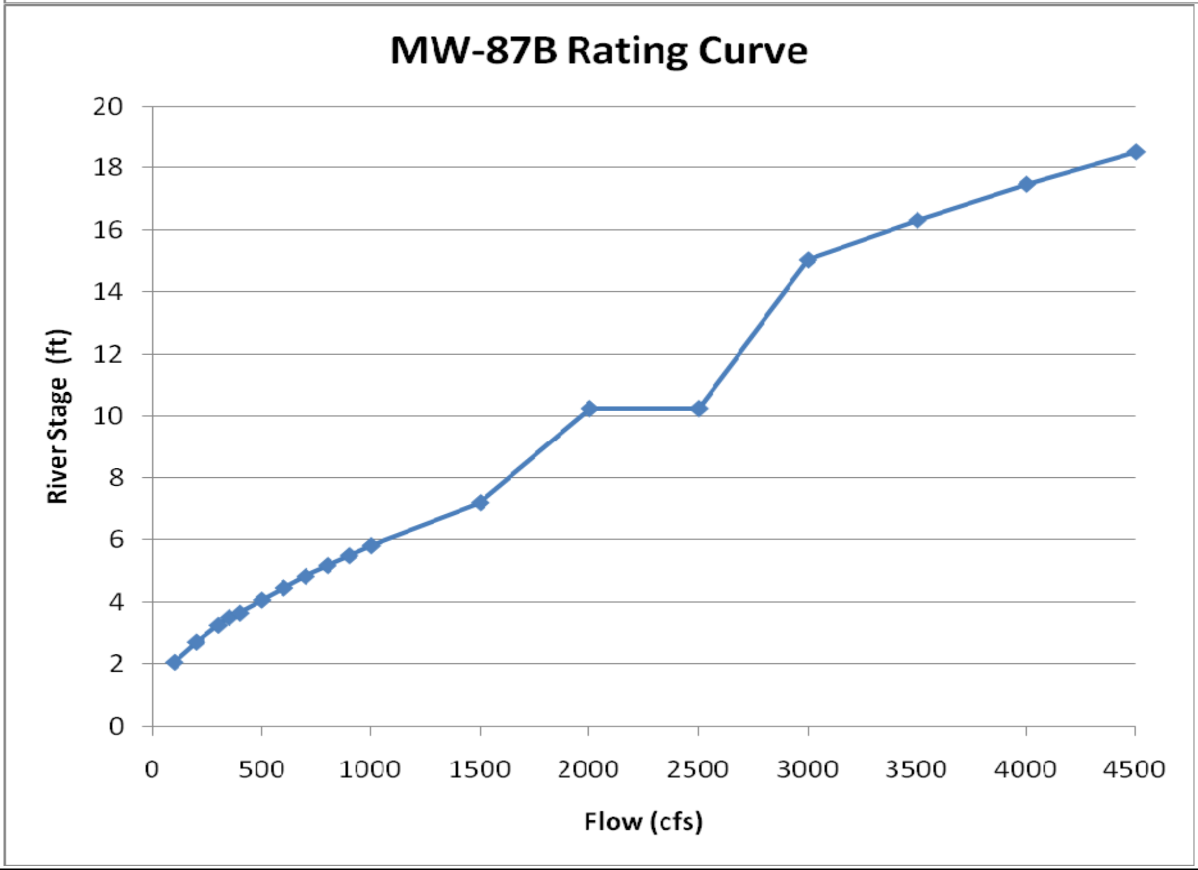

R2B-2 Rating Curve
River Stage (ft)
Flow (cfs)
0
1
2
3
4
5
6
7
8
9
10
0
500
1000
1500
2000
2500
3000
3500
4000
4500


R3-1 Rating Curve
River Stage (ft)
18
16
14
12
10
8
6
4
2
0
0
500
1000
1500
2000
2500
3000
3500
4000
4500
Flow (cfs)


R3-6 Rating Curve
River Stage (ft)
14
12
10
8
6
4
2
0
0
500
1000
1500
2000
2500
3000
3500
4000
4500
Flow (cfs)


R3-7 Rating Curve
River Stage (ft)
0
2
4
6
8
10
12
14
16
18
0
500
1000
1500
2000
2500
3000
3500
4000
4500
Flow (cfs)


MW-84 Rating Curve
River Stage (ft)
0
2
4
6
8
10
12
14
16
18
20
0
500
1000
1500
2000
2500
3000
3500
4000
4500
Flow (cfs)


MW-87B Rating Curve
River Stage (ft)
0
2
4
6
8
10
12
14
16
18
20
0
500
1000
1500
2000
2500
3000
3500
4000
4500
Flow (cfs)

SJRRP Flow Bench Evaluation

March 25, 2010

The planned flow increase to 1100 cfs at Friant Dam, scheduled for March 25, 2010, will be delayed and reevaluated on Monday, March 29th. Reclamation will request a new flow schedule from the Restoration Administrator to account for the adjustments. The evaluation of the increase is shown below.

As of March 24, 2010:

1. Flows rates from provisional real-time data are below known conveyance thresholds (8,000 cfs in Reach 2A, 1,300 cfs in Reach 2B, and 1,300 cfs in Reach 3).

2. Mendota Pool operations calls did not identify problems with increasing to the next bench.

3. The seepage hotline received three calls. All evaluations determined the planned releases could proceed.

4. Real-time provisional groundwater data does not show that groundwater depths have crossed identified thresholds. Water table elevations in R3-1 are fluctuating. Water table elevations in MW-54 are continuing to increase.

5. Manually monitored groundwater wells do not show unaddressed groundwater depths crossing identified thresholds. R2B-1 and MW-49B are within the buffer zones and have undergone site evaluations. MW-55B will undergo site evaluation as part of the bench increase.

6. Measured losses in Reach 2A from operations estimates show approximately 150 to 160 cfs, and appear to be stabilizing. Changes in flows below sack dam appear to be slowing, but have not yet stabilized.

7. Projected groundwater levels from the upcoming increase in flow are below thresholds except for wells R2B-1, MW-49B, MW-55B, and MW-47. Hydraulic rating curves are updated based on new modeling information and site evaluations.

8. The LSJLD was notified of potential increases in flows and identified concerns with approaching channel capacity in some reaches. The LSJLD requested flow adjustments to occur during the work week when staffing is available.

9. The CCID was notified of potential increases in flows and identified concerns with developing operating experience at Mendota Dam since Sack Dam flows have not peaked and stabilized from the previous flow bench; concerns with changes in CCID monitoring well elevations that have not peaked or stabilized and may well be within the flow trigger reduction range the elevations peak from the previous bench; and concerns with the proximity to thresholds in Reach 2B wells.

10. The SLCC was notified of potential increases in flows and did not identify any potential issues.

The seepage management plan uses existing groundwater elevations and extrapolates stage changes to estimate future groundwater depths. Prediction accuracy has generally been conservative at about 0.5 feet error. Telemetered data in Reach 2B shows that existing groundwater elevations have not stabilized and may continue to rise by several tenths of a foot. Several wells are within the buffer zone and predicted to come within about 0.1 foot of potential damages. The inaccuracy from potential transient effects and prediction error exceeds the margin of safety on the potential damages. Based on past experience, water table elevations in MW-54 will require at least an additional 3 days to stabilize. At that time, the monitoring network should have registered any transient effects and uncertainty will include only prediction error.

The recommendation from the Restoration Administrator for the 2010 Interim Flows prioritized evaluating losses. The hydrographs were developed to establish flow benches that allow reaching steady-state equilibrium. The monitoring network shows that additional time would be required to achieve steady-state surface flows as well as groundwater interactions.

At the proposed flow bench, operations at Mendota and Sack Dam will exceed historical experience. Stable flow conditions would allow for more accurate development of operating rules by providing a more certain foundation in preparation for future flow benches. Accurate operating rules will improve the ability to establish future studies in reaches downstream of Mendota and Sack Dams.

The combination of avoiding seepage losses and developing a superior data set requires delaying flow adjustments. The flow bench will be reevaluated on Monday to determine if the planned increase can proceed.

Data

The weekly groundwater report with manual measurements via electronic well sounder and recent flow data is available at: http://restoresjr.net/activities/if/index.html.

Table 1 shows the anticipated changes in flows used to predict future groundwater depths based on Exhibit B loss assumptions and an estimated 300 cfs delivery to Arroyo Canal.

Table 1 Anticipated Change in Flows

	Current Target (cfs)	Future Target (cfs)	Change (cfs)
Reach 2A	675	975	300
Reach 2B	555	855	300
Reach 3 and 4A	855	1155	300

Table 2 shows the current and predicted rise in groundwater based on estimated changes in river stage and the conceptual model shown in Figure 1. Subsequent pages show the rating curves for each of the key wells from the TetraTech hydraulic model of existing conditions (MEI 2002).

Table 2 Predicted Increases in Groundwater Levels for Key Wells

Well_ID	Site	Buffer Zone (ft bgs)	Screen Depth (ft bgs)	Current Depth March 14th (ft bgs)	Predicted Stage Increase (ft)	Anticipated Depth (ft)
FA-9	Reach 2A – Transect 12 – Left	4-6	12-32	8.76	0.515	8.2
MW-47	**Reach 2A – Transect 12 – Right**	**6-8**	**20-40**	**8.15**	**0.515**	**7.6**
MA-4	Reach 2A – Transect 13 – Right	6-8	15-25	11.47	0.72	10.75
MW-49B	**Reach 2A – Transect 13 – Left**	**4-6**	**10-20**	**5.30**	**0.72**	**4.6**
MW-54B	Reach 2B – San Mateo Ave. – Right	TBD	TBD	15.64	1.035	14.6
MW-55B	**Reach 2B – San Mateo Ave. – Left**	**6-8**	**10-15**	**7.1**	**1.035**	**6.1**
R2B-1	**Reach 2B – Right**	**4-6**	**8-11**	**5.40**	**0.4635**	**4.9**
R2B-2	Reach 2B – Right	4-6	17-20	12.36	0.4635	11.9
R3-1	Reach 3 – Right	4-6	9-24	9.35	0.9641	8.4
R3-6	Reach 3 – Right	4-6	17-20	8.82	0.9012	7.9
R3-7	Reach 3 – Right	3-5	17-20	7.33	0.9798	6.4
MW-84	Reach 4A – Highway 152 – Right	4-6	32-52	34.82	0.8949	33.9
MW-87B	Reach 4A – Highway 152 - Left	4-6	TBD	>14 (dry)	0.8949	13.1 to dry

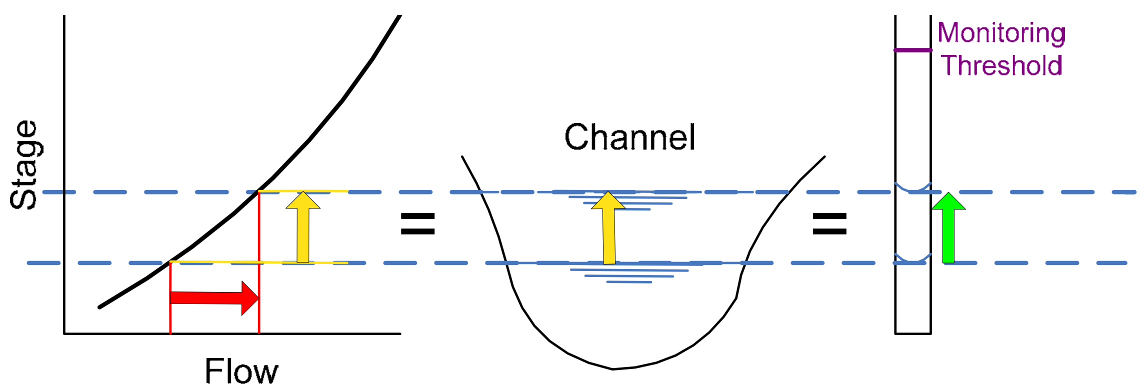
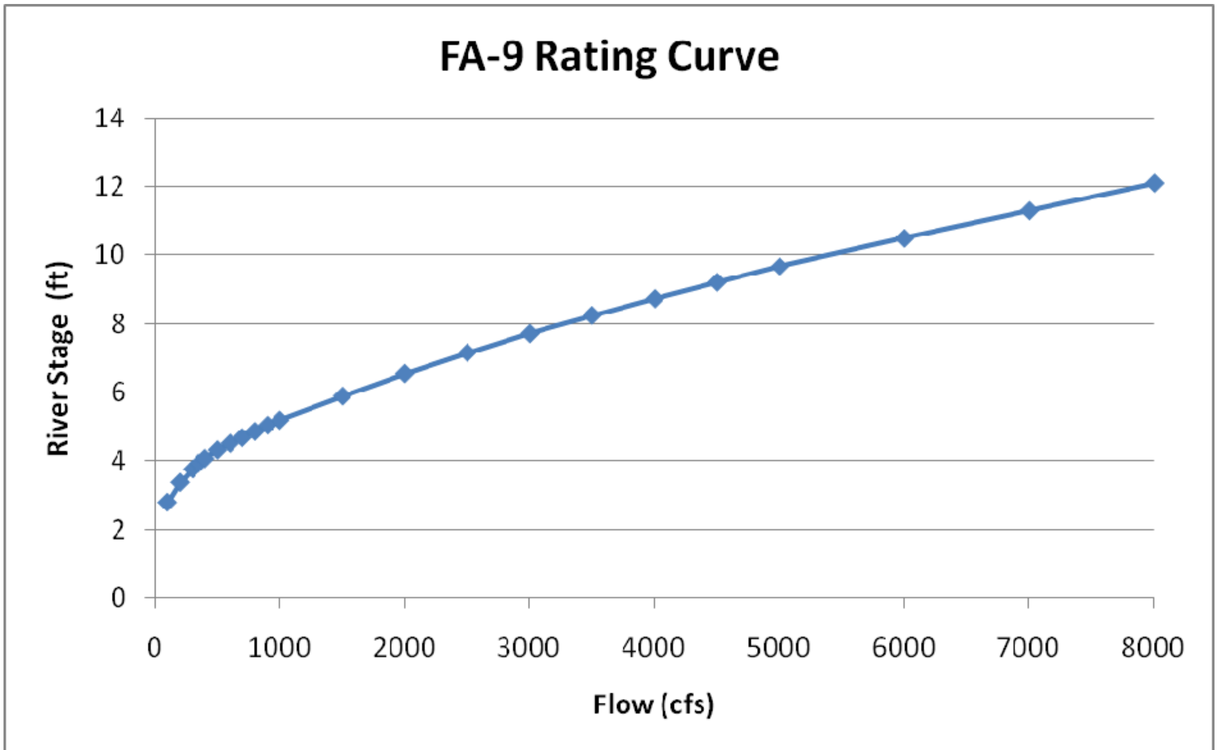
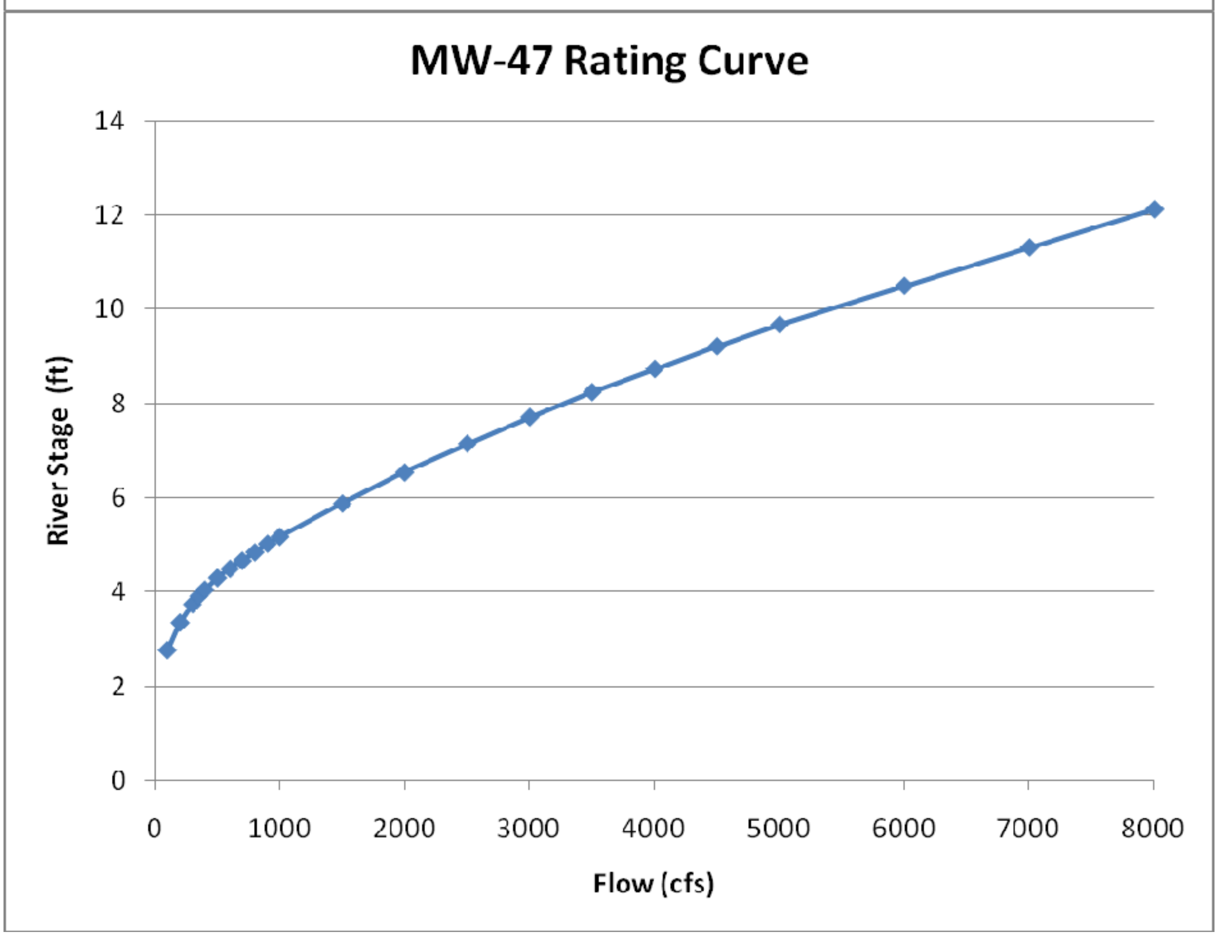
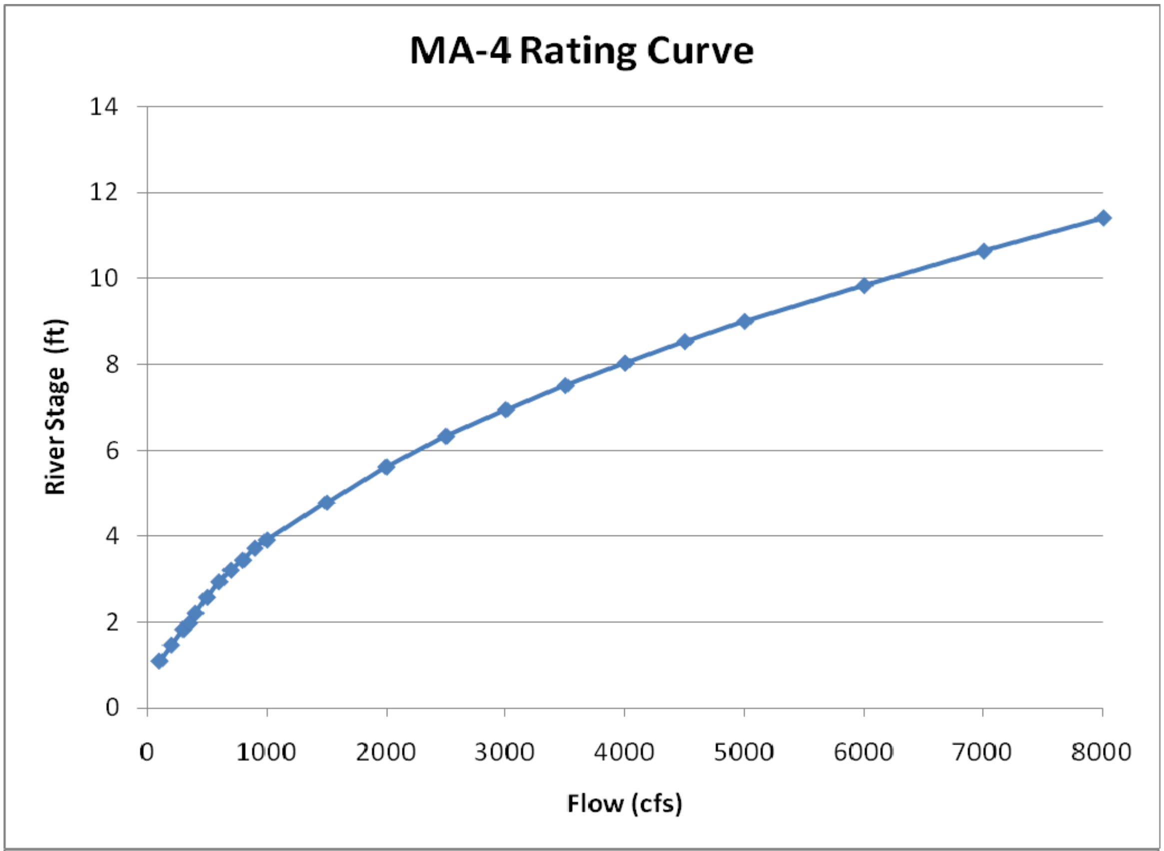
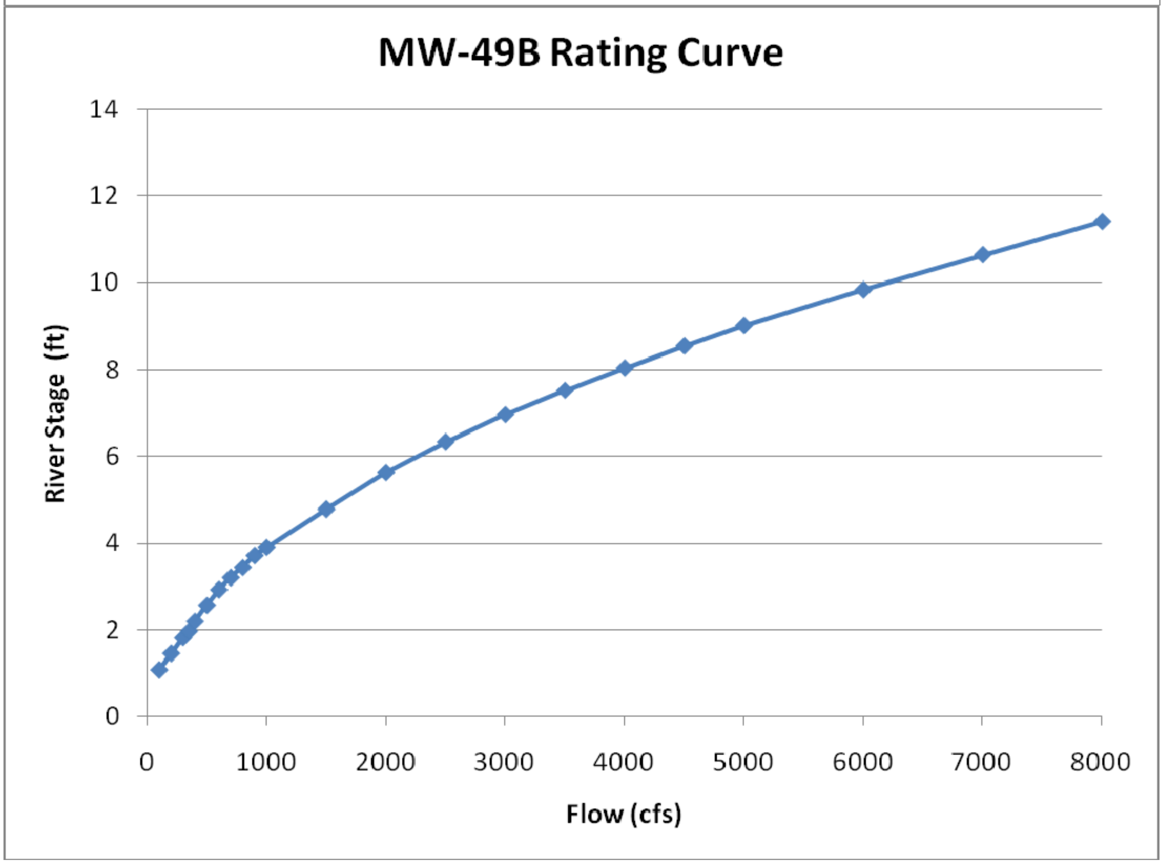


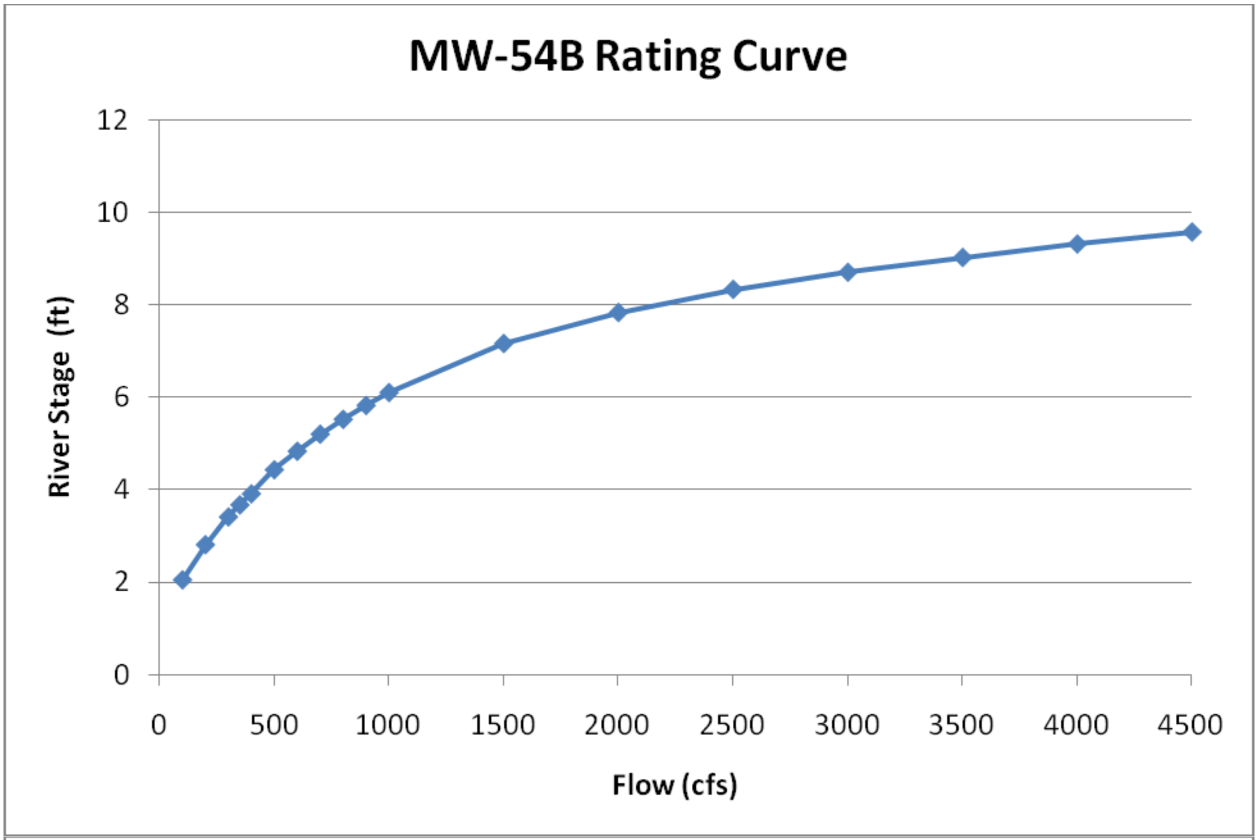
Figure 1 Conceptual Model for Flow Bench Evaluations Estimated Groundwater Depths

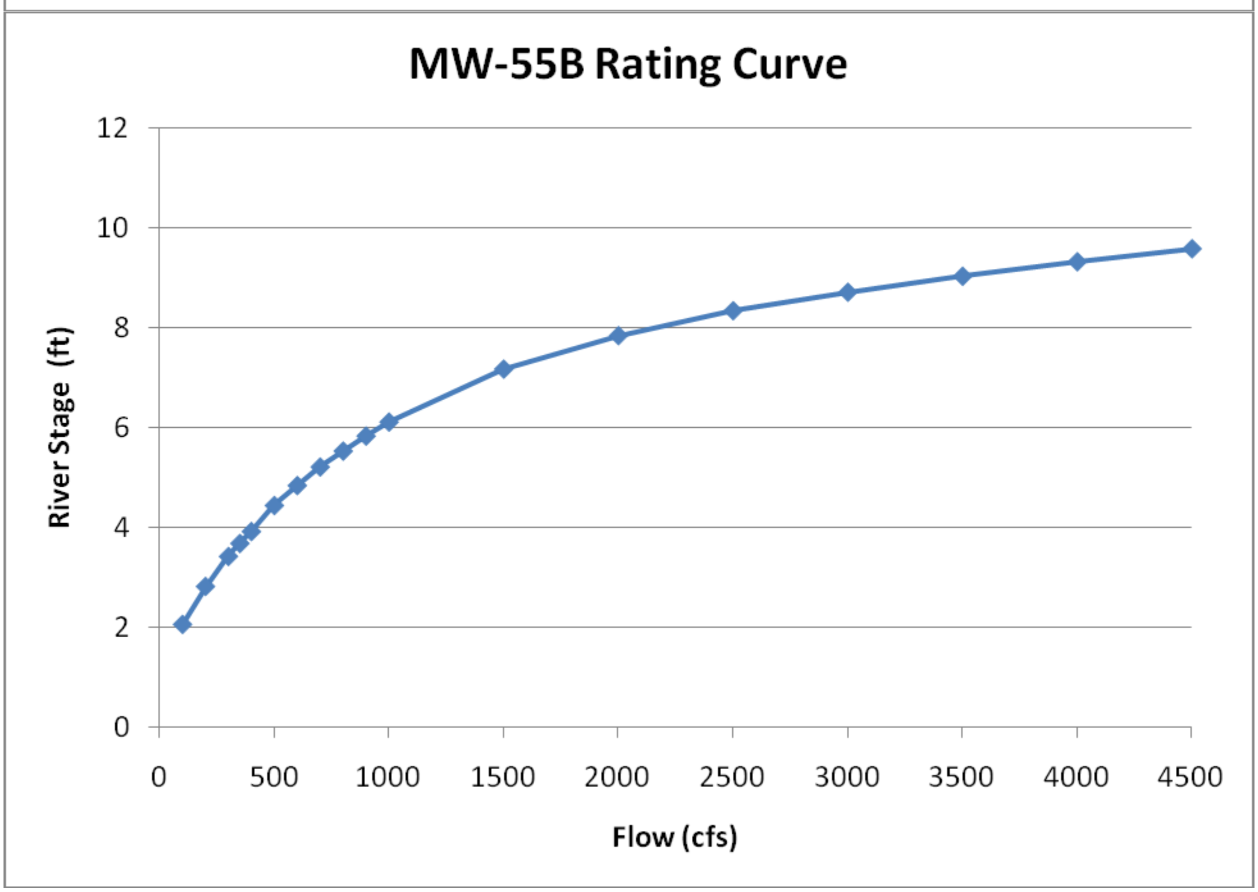

FA-9 Rating Curve
River Stage (ft)
Flow (cfs)
14
12
10
8
6
4
2
0
0
1000
2000
3000
4000
5000
6000
7000
8000

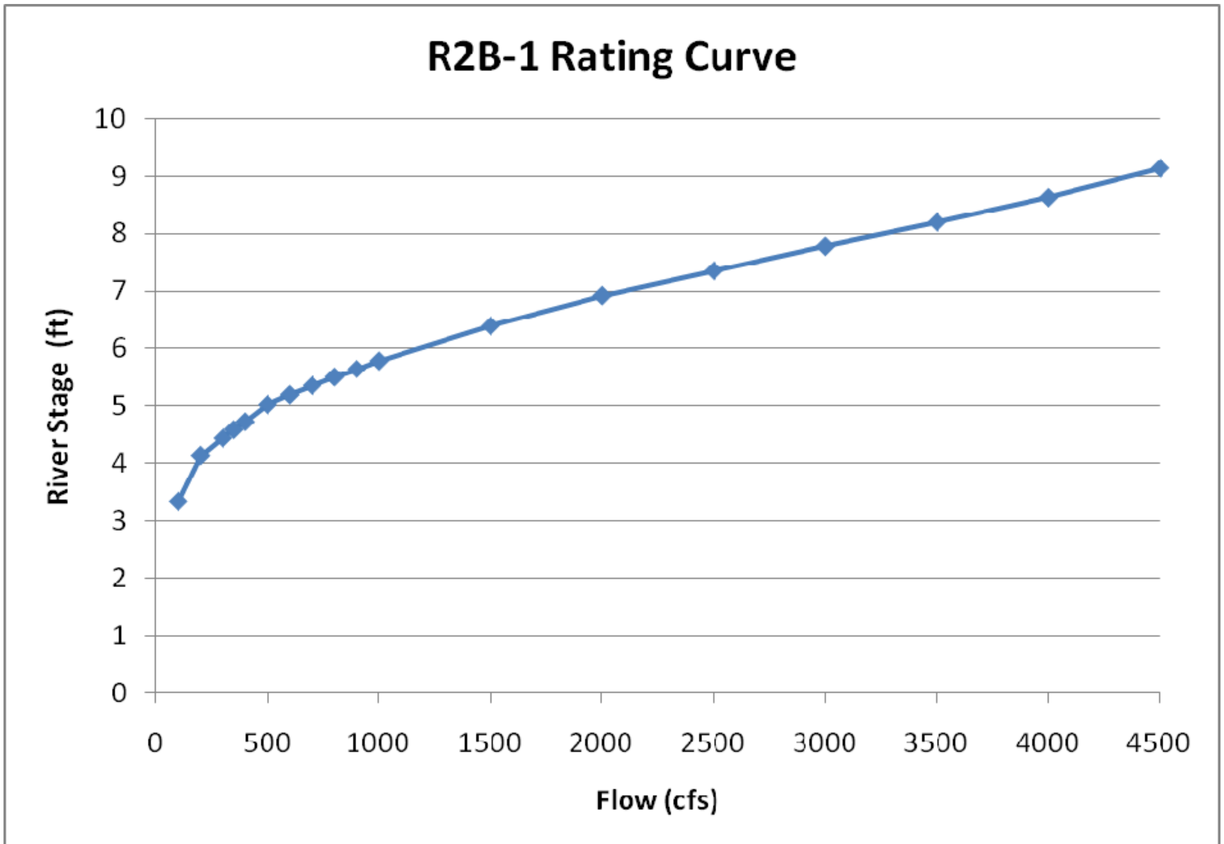

MW-47 Rating Curve
River Stage (ft)
Flow (cfs)
14
12
10
8
6
4
2
0
0
1000
2000
3000
4000
5000
6000
7000
8000

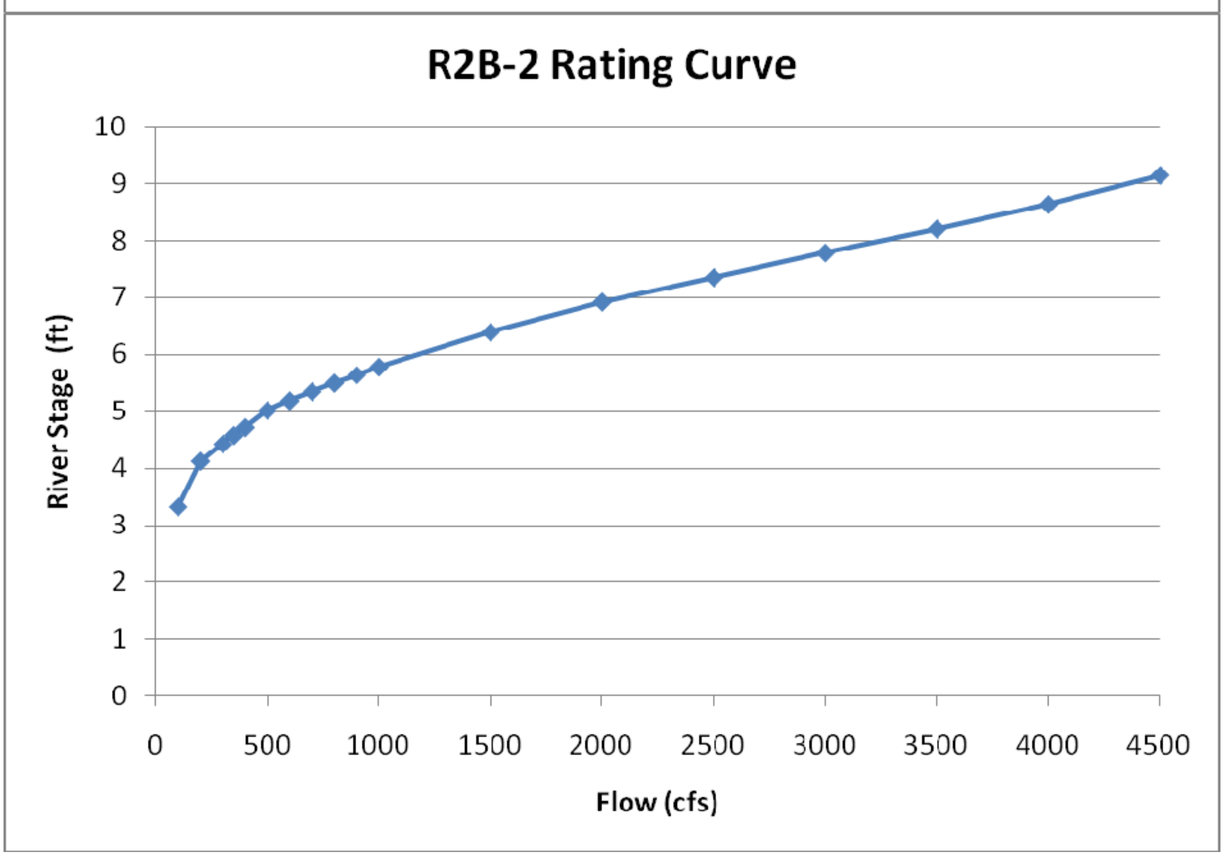

MA-4 Rating Curve
River Stage (ft)
Flow (cfs)
0
2
4
6
8
10
12
14
0
1000
2000
3000
4000
5000
6000
7000
8000

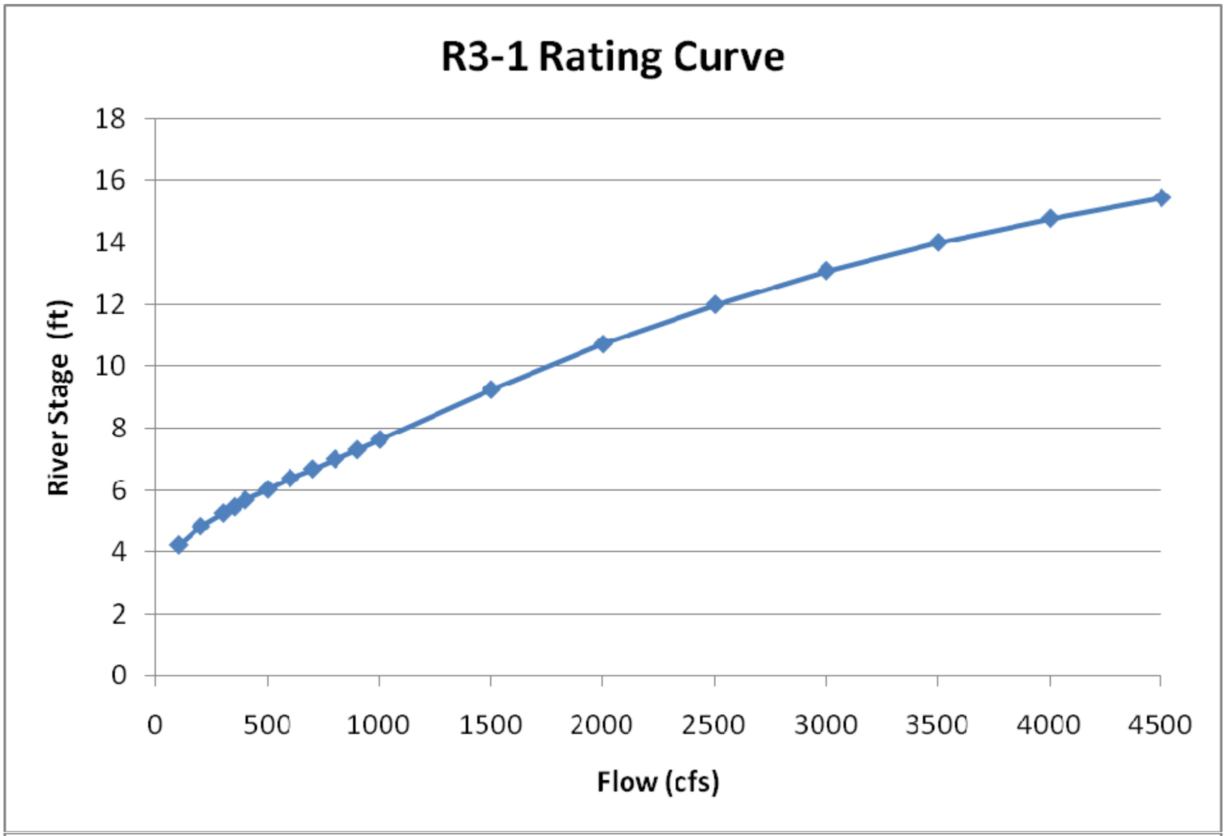

MW-49B Rating Curve
River Stage (ft)
Flow (cfs)
0
2
4
6
8
10
12
14
0
1000
2000
3000
4000
5000
6000
7000
8000

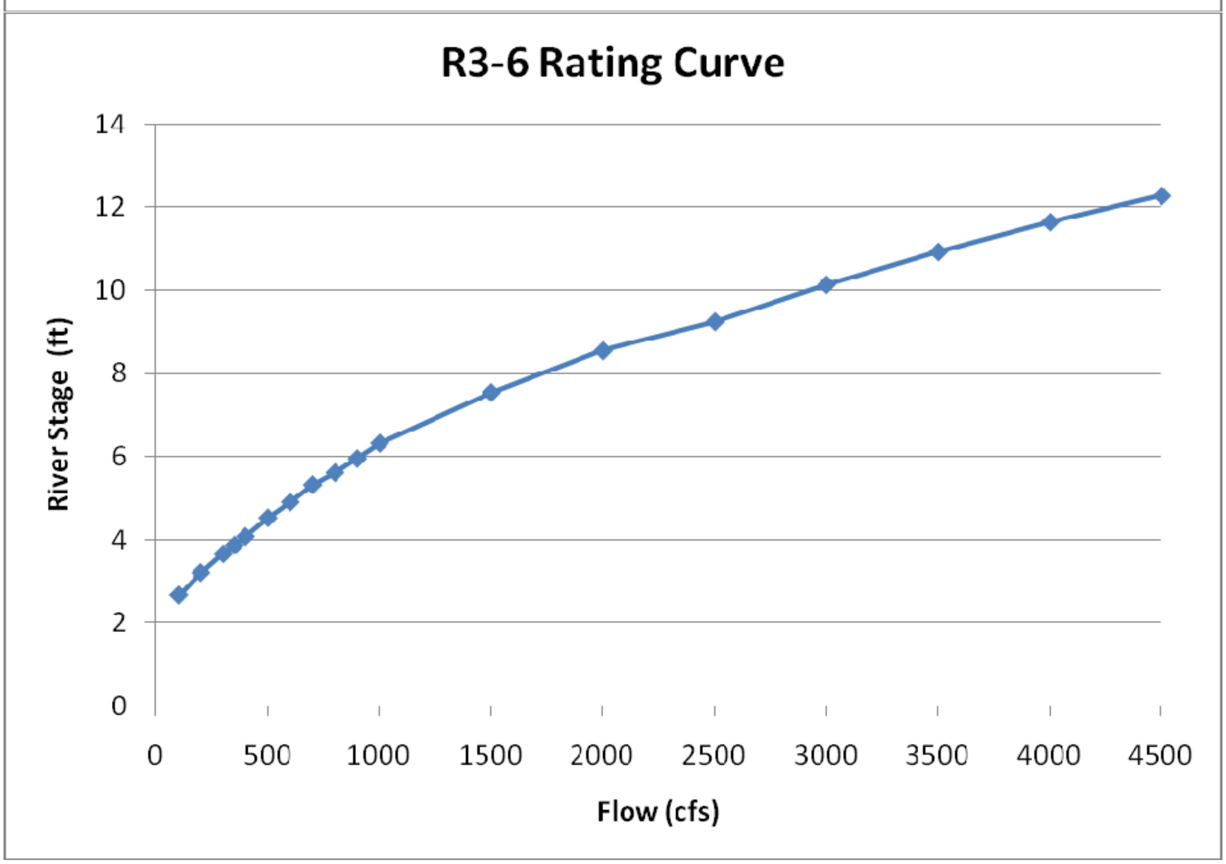

MW-54B Rating Curve
River Stage (ft)
0
2
4
6
8
10
12
0
500
1000
1500
2000
2500
3000
3500
4000
4500
Flow (cfs)

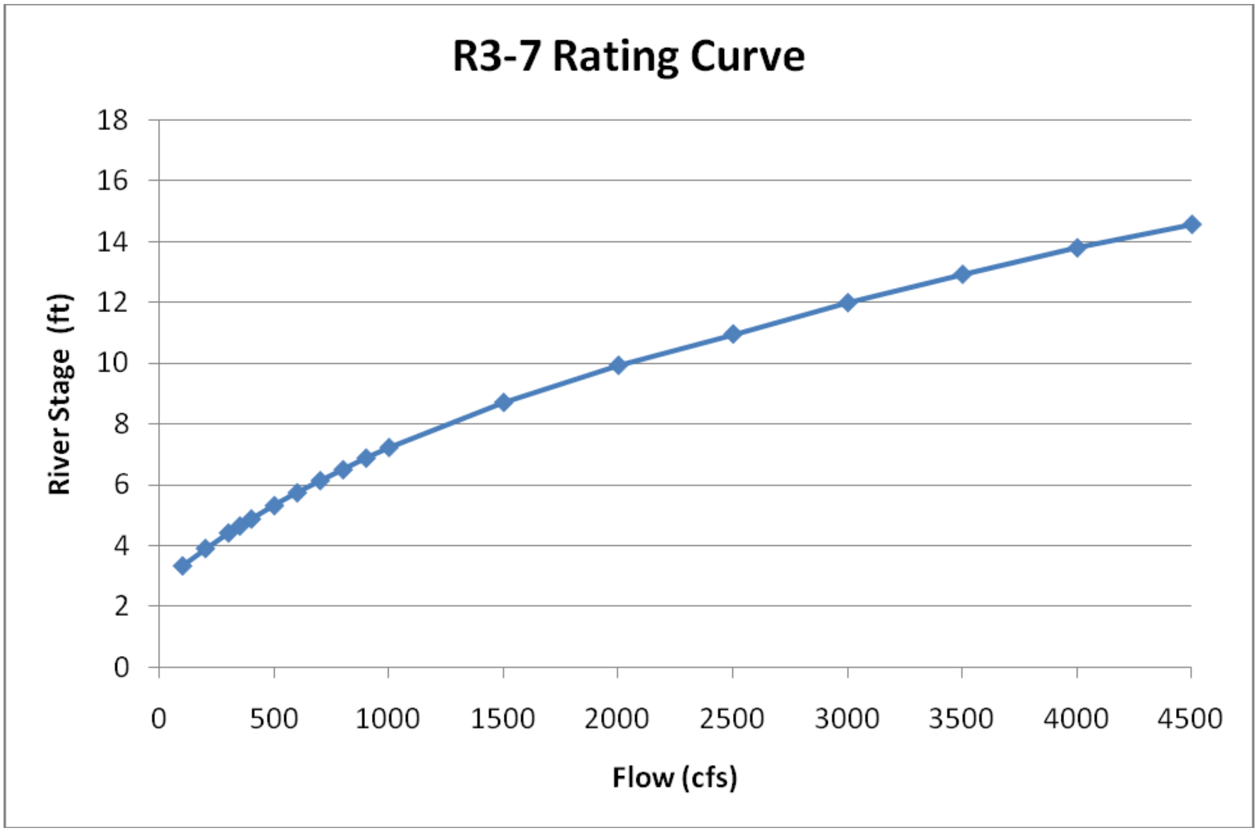

MW-55B Rating Curve
River Stage (ft)
0
2
4
6
8
10
12
0
500
1000
1500
2000
2500
3000
3500
4000
4500
Flow (cfs)

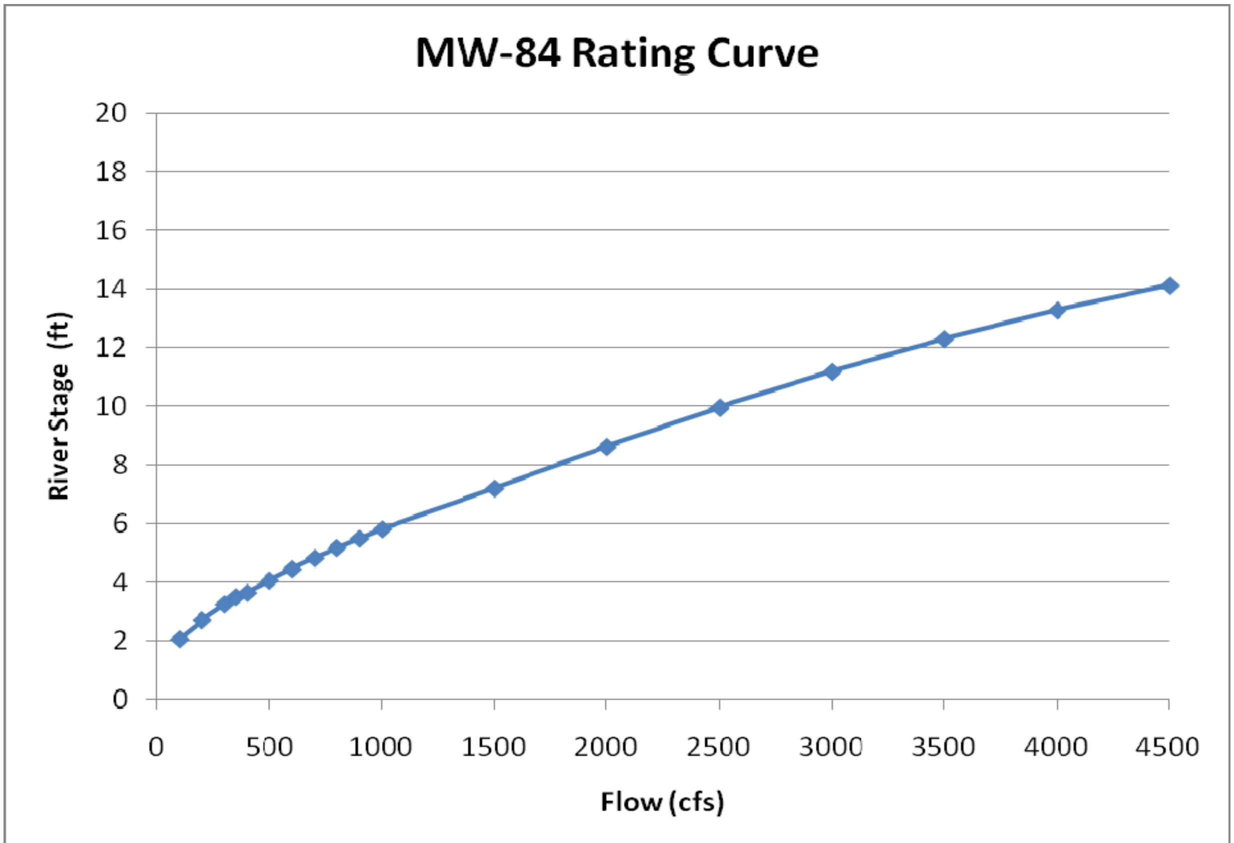

R2B-1 Rating Curve
River Stage (ft)
0
1
2
3
4
5
6
7
8
9
10
0
500
1000
1500
2000
2500
3000
3500
4000
4500
Flow (cfs)

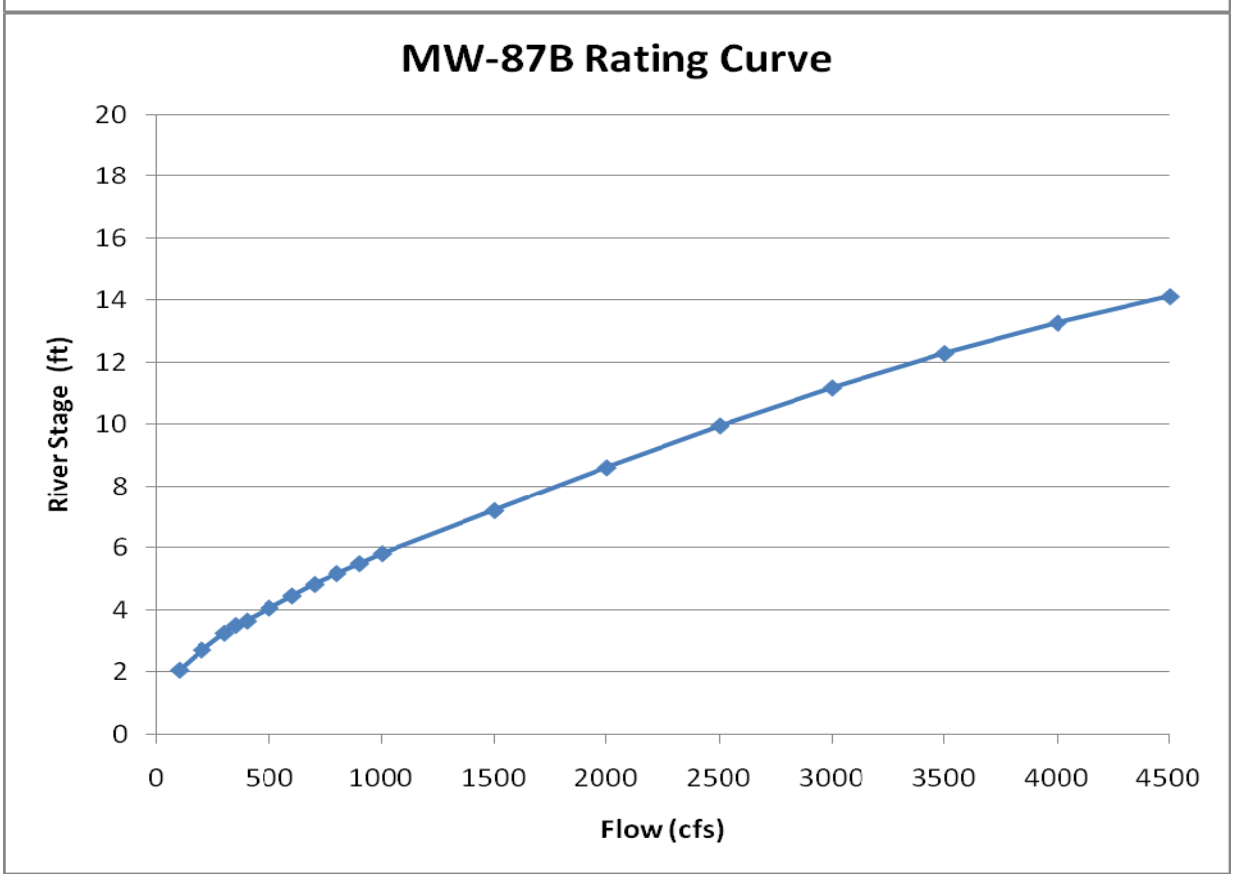

R2B-2 Rating Curve
River Stage (ft)
0
1
2
3
4
5
6
7
8
9
10
0
500
1000
1500
2000
2500
3000
3500
4000
4500
Flow (cfs)


R3-1 Rating Curve
River Stage (ft)
0
2
4
6
8
10
12
14
16
18
0
500
1000
1500
2000
2500
3000
3500
4000
4500
Flow (cfs)


R3-6 Rating Curve
River Stage (ft)
0
2
4
6
8
10
12
14
0
500
1000
1500
2000
2500
3000
3500
4000
4500
Flow (cfs)


R3-7 Rating Curve
River Stage (ft)
Flow (cfs)
0
2
4
6
8
10
12
14
16
18
0
500
1000
1500
2000
2500
3000
3500
4000
4500


MW-84 Rating Curve
River Stage (ft)
Flow (cfs)
0
2
4
6
8
10
12
14
16
18
20
0
500
1000
1500
2000
2500
3000
3500
4000
4500


MW-87B Rating Curve
River Stage (ft)
Flow (cfs)
0
2
4
6
8
10
12
14
16
18
20
0
500
1000
1500
2000
2500
3000
3500
4000
4500

SJRRP Flow Bench Evaluation

March 29, 2010

Flows below Friant Dam will increase to 1100 cfs on March 29, 2010. The bench increase was shifted from the illustrative hydrographs in the Restoration Administrator 2010 Interim Flow Recommendations for the San Joaquin River Restoration Program, February 1 through December 1, 2010 to allow additional time for the system to stabilize per the March 25th evaluation. The evaluation of the increase is provided below.

As of March 29, 2010:

1. Flows rates from provisional real-time data are below known conveyance thresholds (8,000 cfs in Reach 2A, 1,300 cfs in Reach 2B, and 1,300 cfs in Reach 3).

2. Mendota Pool operations calls identified a potential need to change gate operations at Chowchilla Bifurcation Structure to pass a sand dune through the structure.

3. The seepage hotline received four calls, described below. All evaluations determined the planned releases could proceed.

4. Real-time provisional groundwater data does not show groundwater depths crossing identified thresholds.

5. Manually monitored groundwater wells do not show unaddressed groundwater depths crossing identified thresholds and appear to have stabilized.

6. Measured losses in Reach 2A from operations estimates show approximately 165 cfs, and are stabilizing. Changes in flows below Sack Dam appear stable based on CDEC stage telemetry.

7. Projected groundwater levels from the upcoming increase in flow are below thresholds except for wells R2B-1, MW-49B, MW-55B, and MW-47. Evaluations are described below.

8. The LSJLD was notified of potential increases in flows and identified concerns with approaching channel capacity in some reaches. The LSJLD provided information on Monday, March 29th that flows are adjacent to or inundating 12 flapgates and informed Reclamation that the LSJLD would need to increase monitoring activities in these locations.

9. The CCID was notified of potential increases in flows and identified high groundwater levels in CCID monitoring well 144. The landowner has been contacted to schedule a site visit.

10. The SLCC was notified of potential increases in flows and did not identify any potential issues.

A visit to the Chowchilla Bifurcation structure is scheduled for Wednesday March 31st. Changes to the gates should not impact SJRRP operations unless significant backwater occurs.

Seepage hotline call #1 was placed on March 4, 2010 and addressed through the March 16th evaluation. Conditions do not warrant changing the evaluation. Planned releases can occur.

Seepage hotline call #2 was placed on March 11, 2010 and addressed through the March 16th evaluation. Conditions do not warrant changing the evaluation. Planned releases can occur.

Seepage hotline call #3 was placed on March 15, 2010 and addressed through the March 16th evaluation. Conditions do not warrant changing the evaluation. Planned releases can occur.

Seepage hotline call #4 was emailed on March 26, 2010 regarding groundwater levels in CCID monitoring well 144 in reach 4A with reported levels near the top of the buffer zone. A site evaluation is planned. Flows can be recaptured at Mendota Pool if necessary pending the outcome of the site evaluation. Planned releases can occur.

Monitoring Well R2B-1 was addressed though hotline call #1 and addressed through the March 16th evaluation. Conditions do not warrant changing the evaluation. Planned releases can occur.

Monitoring Well 49B is in Reach 2A and addressed through the March 16th evaluation. Conditions do not warrant changing the evaluation. Planned releases can occur.

Monitoring Well 55B, at San Mateo Road on the left bank, shows encroachment within 0.1 feet of the top of the buffer zone. A site investigation and evaluation on March 29th identified the same groundwater elevations as the prior week and a water table sloping down, away from the river. Crops consist of young palm trees near the river and pistachios farther inland. Sequential measurement of similar water tables suggests conditions have peaked. Young trees are unlikely to have extensive root systems and pistachios are salt tolerant. Past predictions of bench increases in this area overestimated groundwater rise at this location due to the downstream control from Mendota Dam. The combination of shallower roots, a sloping water table, and conservative prediction provides confidence in approaching the top of the buffer zone. The real-time well in the same transect and daily evaluations will provide for close monitoring. Planned releases can occur.

Monitoring Well 47, in Reach 2A, shows predicted encroachment into the buffer zone. A site investigation and evaluation is planned. The groundwater level is not predicted to exceed the top of the buffer zone. Planned releases can occur.

Data

The weekly groundwater report with manual measurements via electronic well sounder and recent flow data is available at: http://restoresjr.net/activities/if/index.html.

Table 1 shows the anticipated changes in flows used to predict future groundwater depths based on Exhibit B loss assumptions and an estimated 300 cfs delivery to Arroyo Canal.

Table 1 Anticipated Change in Flows

	Current Target (cfs)	Future Target (cfs)	Change (cfs)
Reach 2A	675	975	300
Reach 2B	555	855	300
Reach 3 and 4A	855	1155	300

Table 2 shows the current and predicted rise in groundwater based on estimated changes in river stage and the conceptual model shown in Figure 1. Subsequent pages show the rating curves for each of the key wells from the Mussetter Engineering, Inc., 2008. San Joaquin HEC-RAS Model Documentation. Technical Memorandum prepared for California Dept. of Water Resources, Fresno, California, June 2. Rating curves were updated March 25, 2010.

Table 2 Predicted Increases in Groundwater Levels for Key Wells

Well_ID	Site	Buffer Zone (ft bgs)	Screen Depth (ft bgs)	Current Depth Week of March 21st (ft bgs)	Predicted Stage Increase (ft)	Anticipated Depth (ft)
FA-9	Reach 2A – Transect 12 – Left	4-6	12-32	8.76	0.515	8.2
MW-47	Reach 2A – Transect 12 – Right	**6-8**	**20-40**	**8.15**	**0.515**	**7.6**
MA-4	Reach 2A – Transect 13 – Right	6-8	15-25	11.47	0.72	10.75
MW-49B	Reach 2A – Transect 13 – Left	**4-6**	**10-20**	**5.30**	**0.72**	**4.6**
MW-54B	Reach 2B – San Mateo Ave. – Right	TBD	TBD	15.64	1.035	14.6
MW-55B[1]	Reach 2B – San Mateo Ave. – Left	**6-8**	**10-15**	**7.1**	**1.035**	**6.1**
R2B-1	Reach 2B – Right	**4-6**	**8-11**	**5.45**	**0.4635**	**5.0**
R2B-2	Reach 2B – Right	4-6	17-20	12.34	0.4635	11.9
R3-1	Reach 3 – Right	4-6	9-24	8.88	0.9641	7.9
R3-6	Reach 3 – Right	4-6	17-20	8.38	0.9012	7.5
R3-7	Reach 3 – Right	3-5	17-20	6.82	0.9798	5.8
MW-84	Reach 4A – Highway 152 – Right	4-6	32-52	33.73	0.8949	32.8
MW-87B	Reach 4A – Highway 152 - Left	4-6	TBD	>14 (dry)	0.8949	13.1 to dry

[1] MW55B measurement occurred on Wednesday, March 24th and again on Monday, March 29th depths were the same on both days.

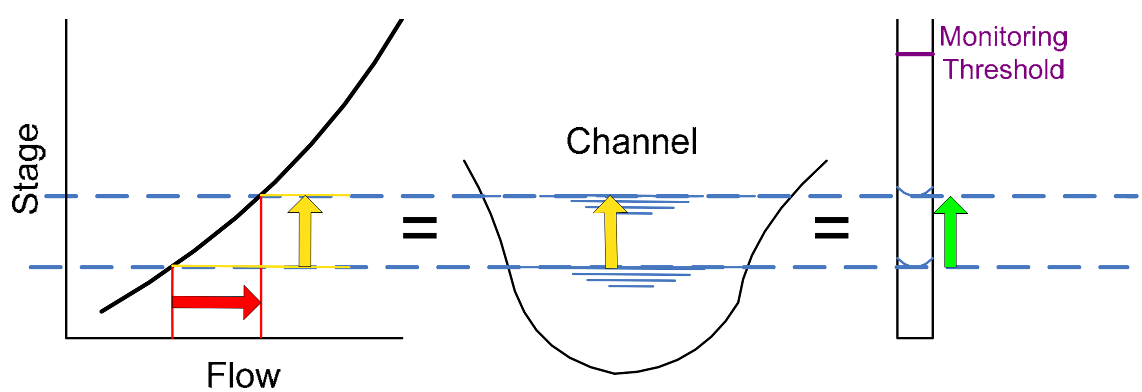
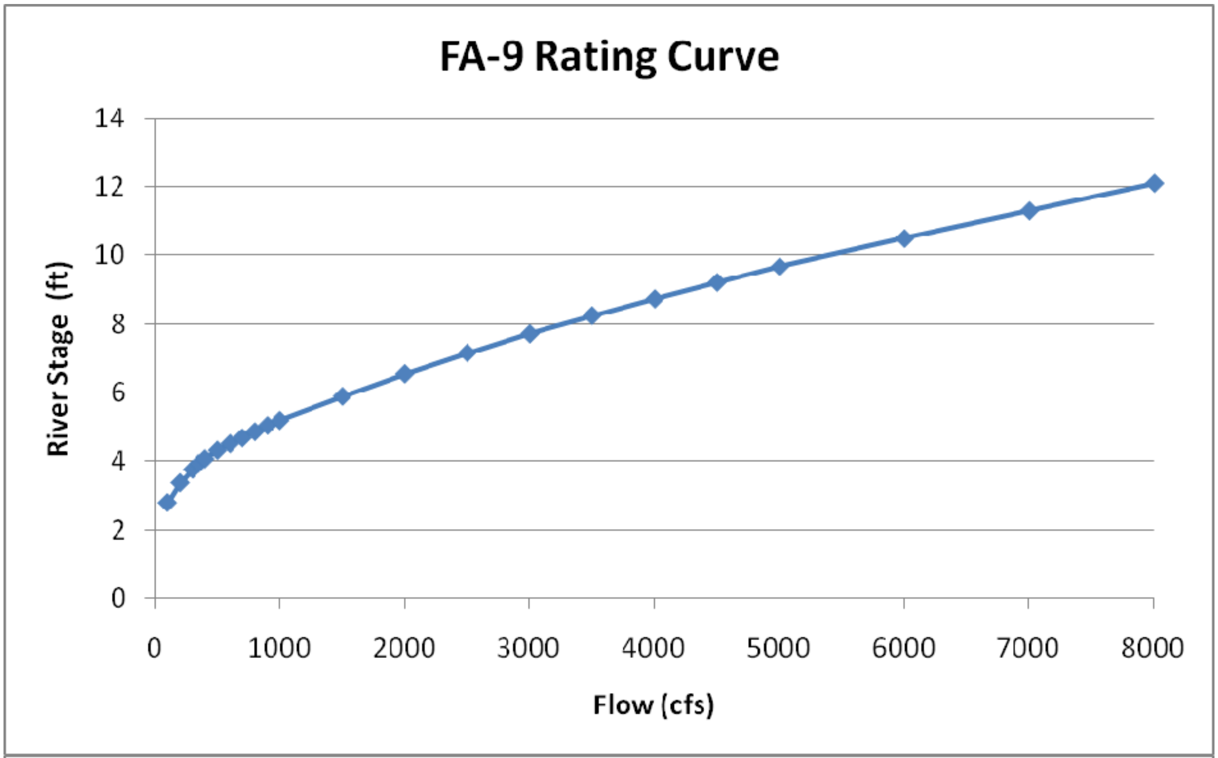
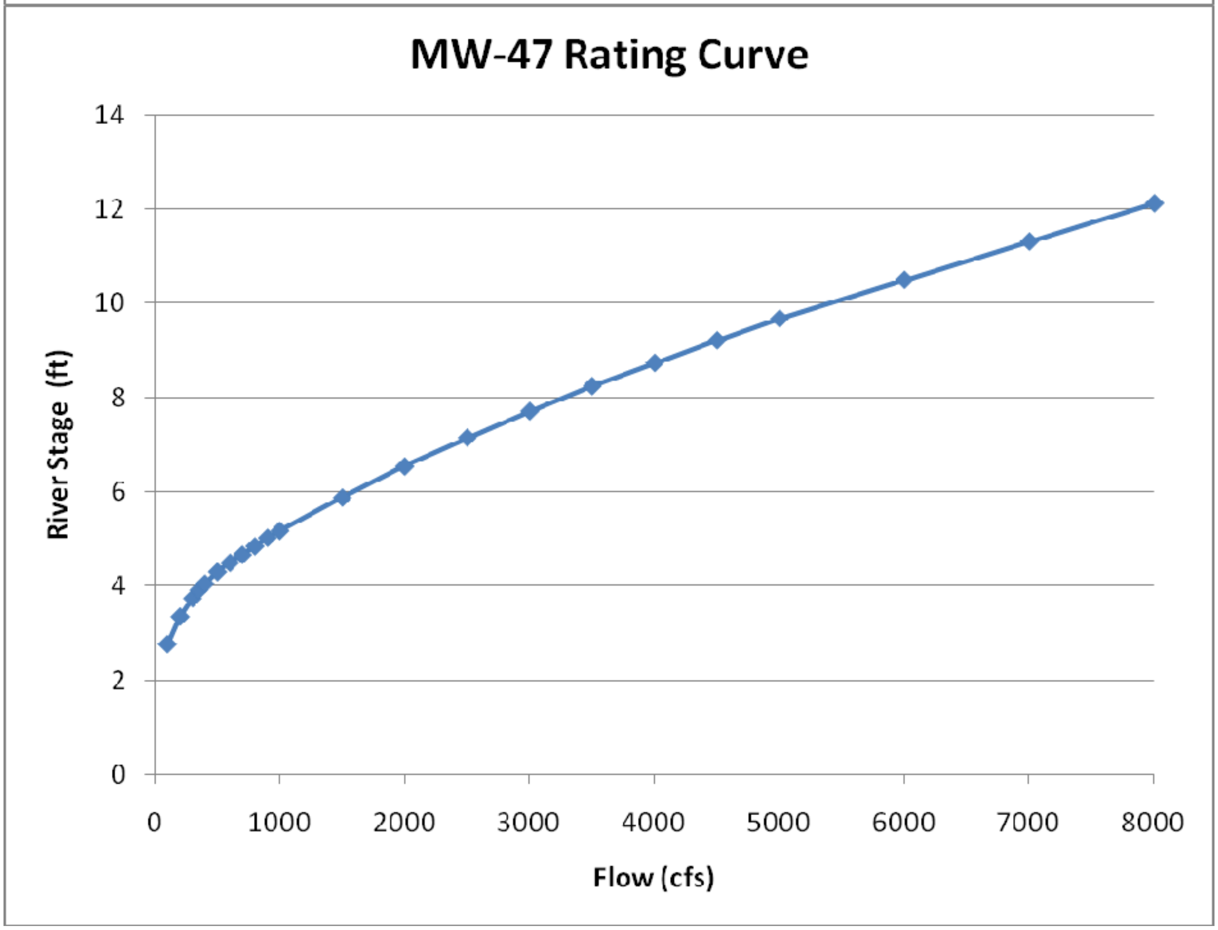
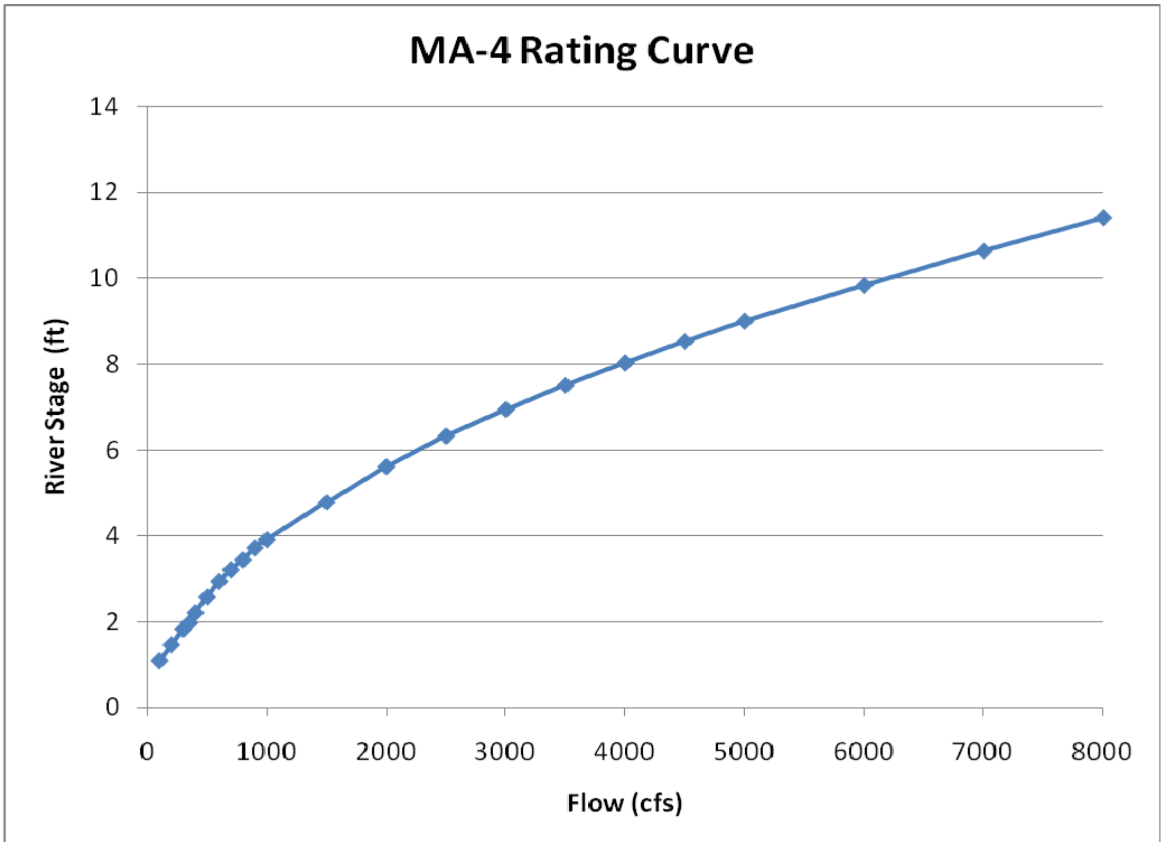
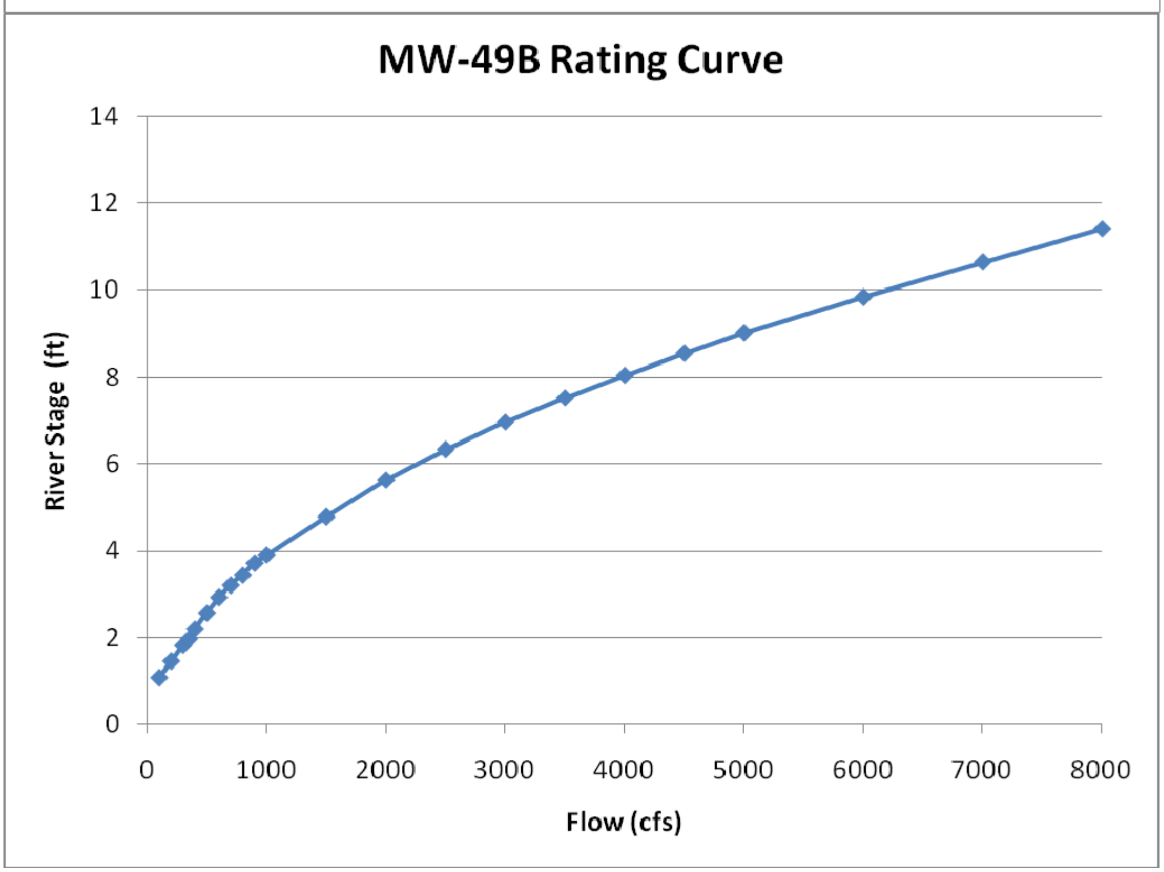


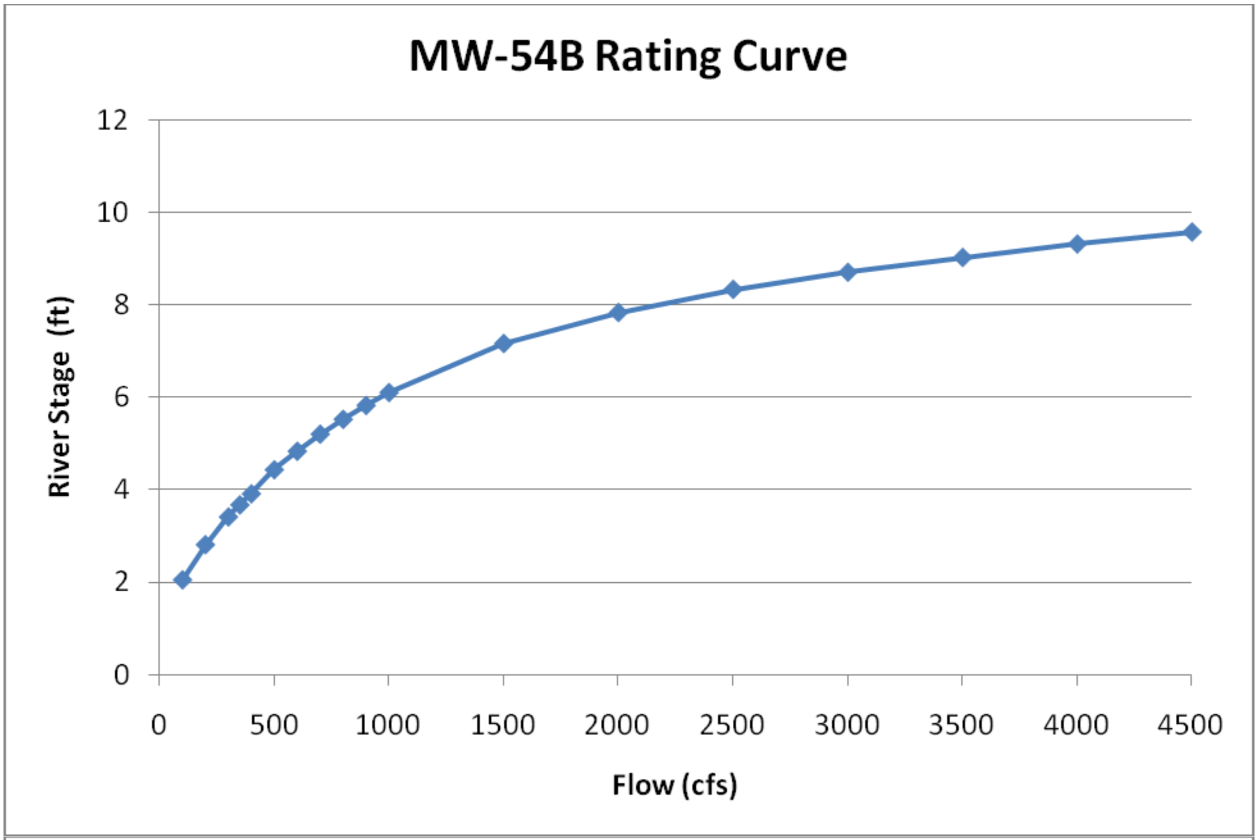
Figure 1 Conceptual Model for Flow Bench Evaluations Estimated Groundwater Depths

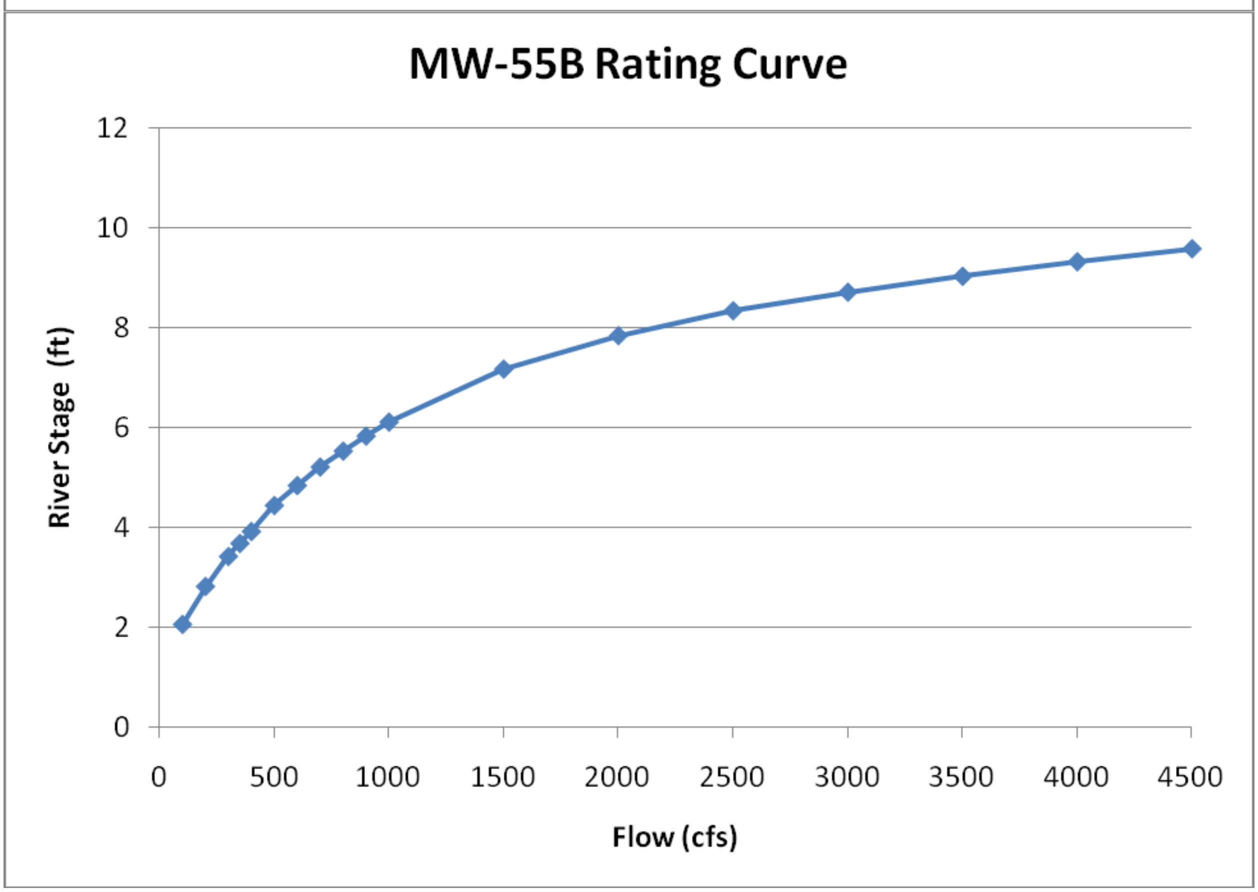

FA-9 Rating Curve
River Stage (ft)
Flow (cfs)
0
2
4
6
8
10
12
14
0
1000
2000
3000
4000
5000
6000
7000
8000

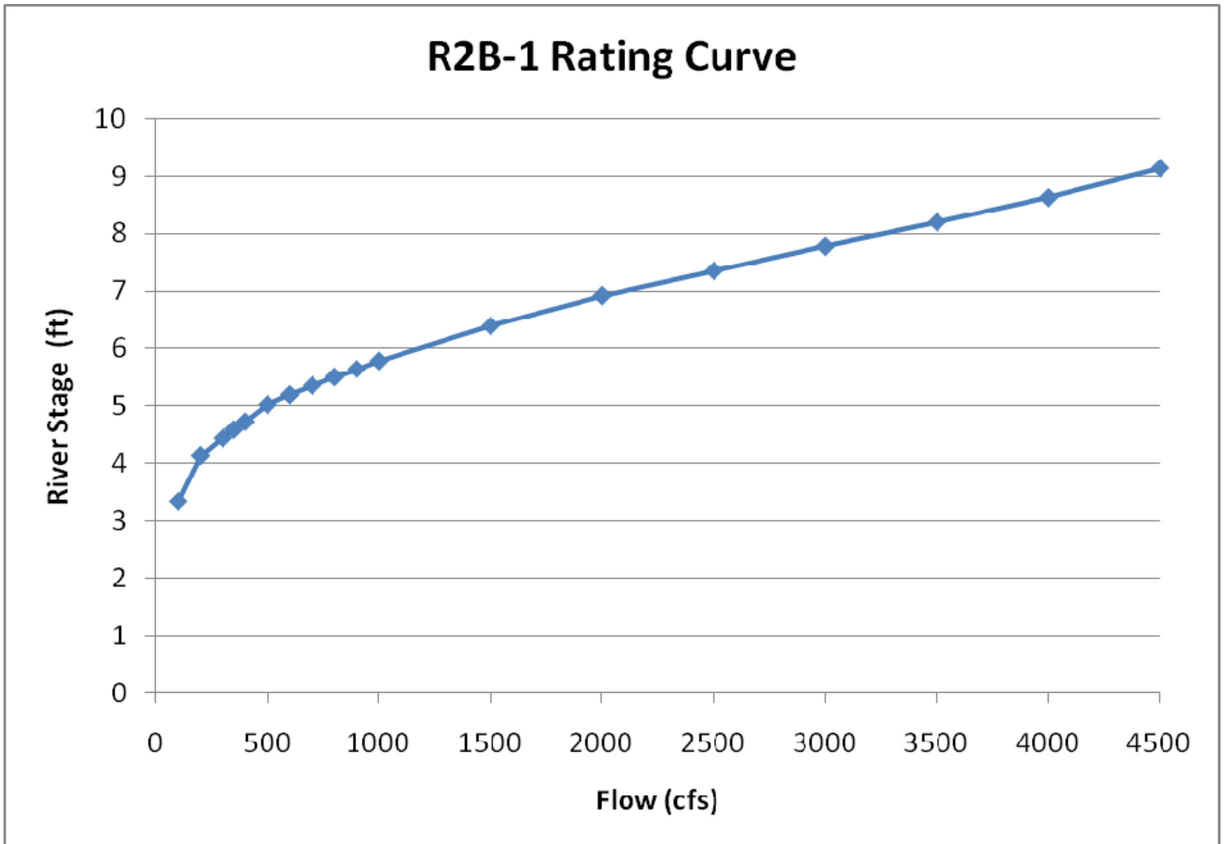

MW-47 Rating Curve
River Stage (ft)
Flow (cfs)
0
2
4
6
8
10
12
14
0
1000
2000
3000
4000
5000
6000
7000
8000


MA-4 Rating Curve
River Stage (ft)
0
2
4
6
8
10
12
14
0
1000
2000
3000
4000
5000
6000
7000
8000
Flow (cfs)


MW-49B Rating Curve
River Stage (ft)
0
2
4
6
8
10
12
14
0
1000
2000
3000
4000
5000
6000
7000
8000
Flow (cfs)


MW-54B Rating Curve
River Stage (ft)
Flow (cfs)
0
2
4
6
8
10
12
0
500
1000
1500
2000
2500
3000
3500
4000
4500


MW-55B Rating Curve
River Stage (ft)
Flow (cfs)
0
2
4
6
8
10
12
0
500
1000
1500
2000
2500
3000
3500
4000
4500


R2B-1 Rating Curve
River Stage (ft)
Flow (cfs)
0
1
2
3
4
5
6
7
8
9
10
500
1000
1500
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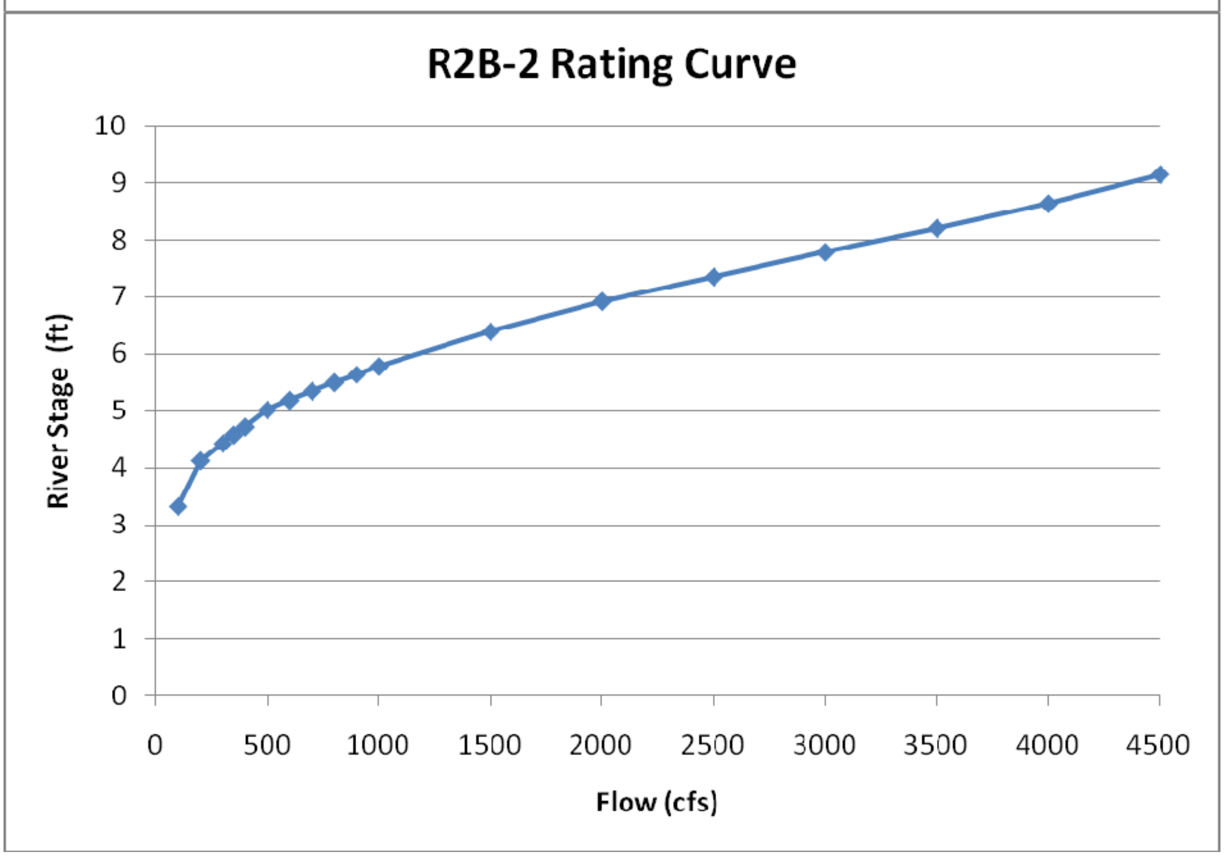
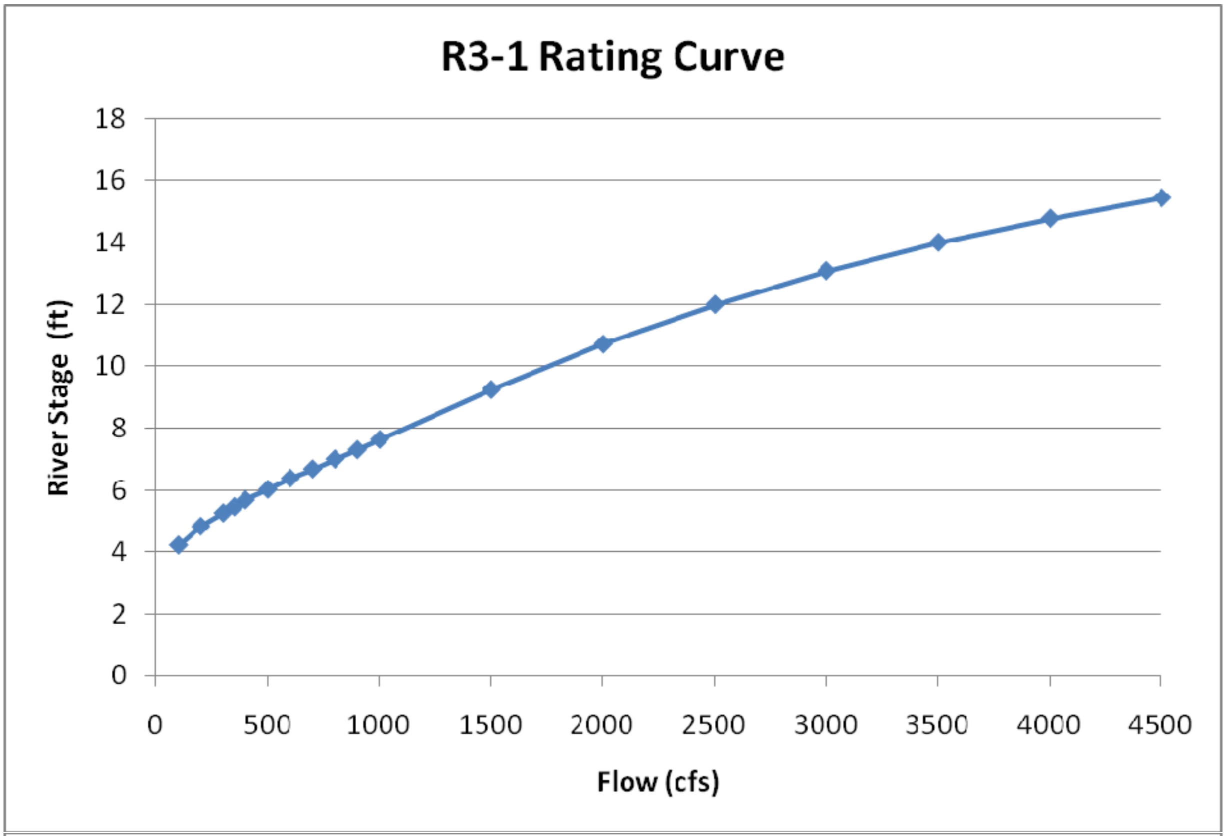
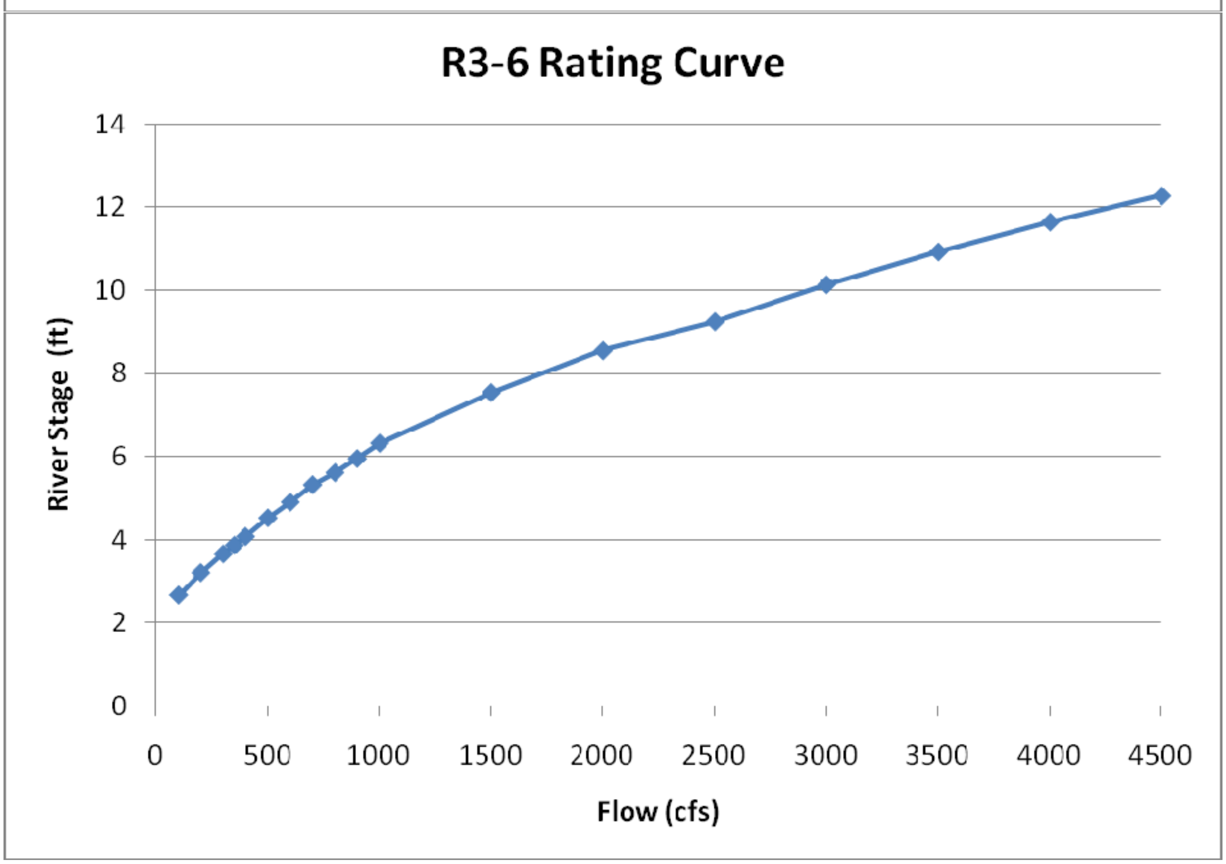
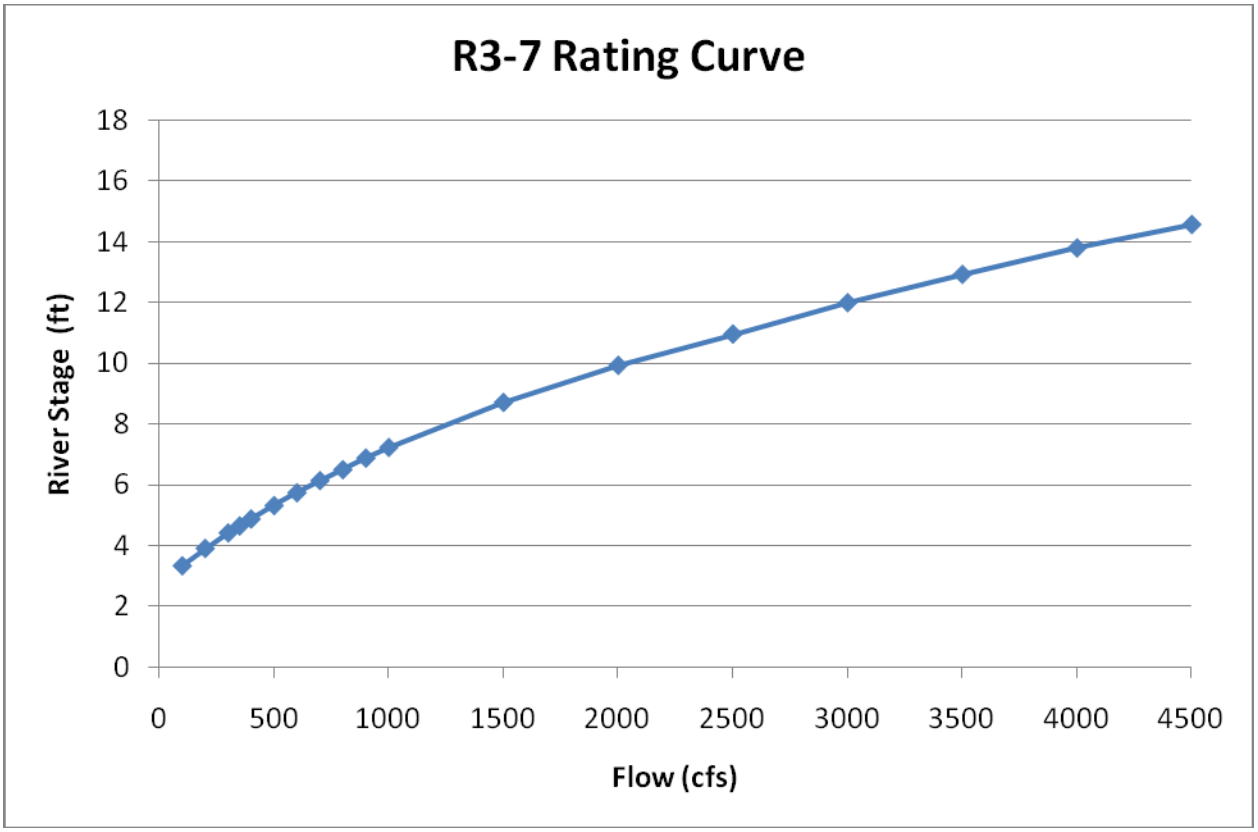
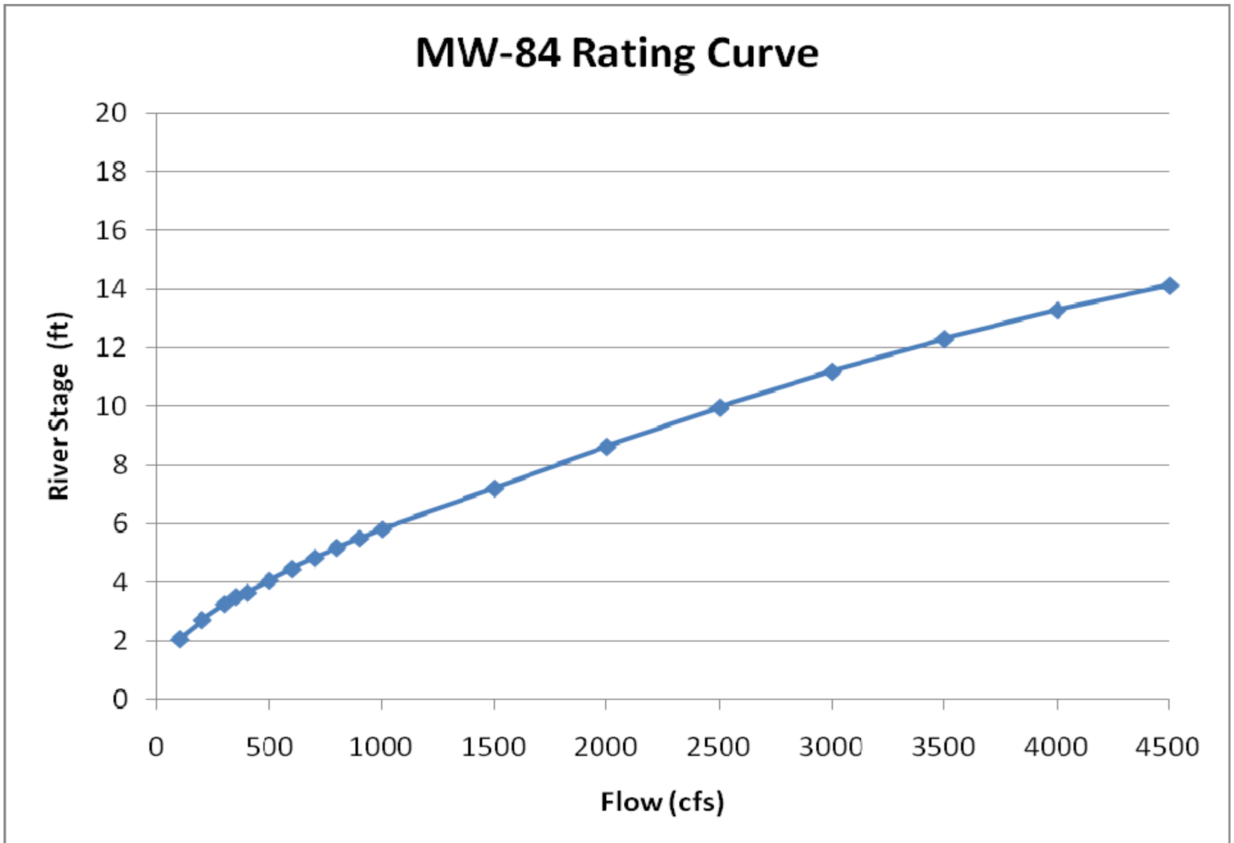
2500
3000
3500
4000
4500

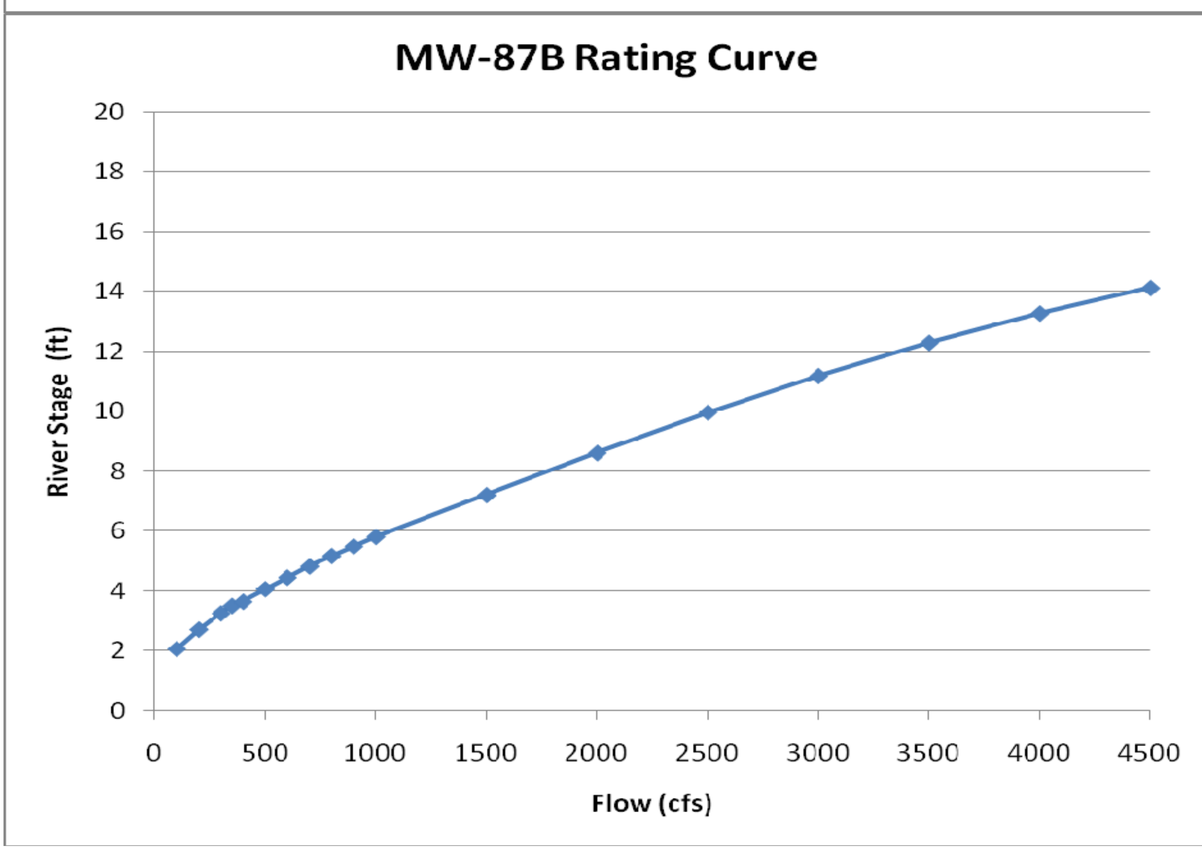

R2B-2 Rating Curve
River Stage (ft)
Flow (cfs)
0
1
2
3
4
5
6
7
8
9
10
500
1000
1500
2000
2500
3000
3500
4000
4500


R3-1 Rating Curve
River Stage (ft)
Flow (cfs)
0
2
4
6
8
10
12
14
16
18
0
500
1000
1500
2000
2500
3000
3500
4000
4500


R3-6 Rating Curve
River Stage (ft)
Flow (cfs)
0
2
4
6
8
10
12
14
0
500
1000
1500
2000
2500
3000
3500
4000
4500


R3-7 Rating Curve
River Stage (ft)
Flow (cfs)
0
2
4
6
8
10
12
14
16
18
0
500
1000
1500
2000
2500
3000
3500
4000
4500


MW-84 Rating Curve
20
18
16
14
12
10
8
6
4
2
0
River Stage (ft)
0
500
1000
1500
2000
2500
3000
3500
4000
4500
Flow (cfs)


MW-87B Rating Curve
20
18
16
14
12
10
8
6
4
2
0
River Stage (ft)
0
500
1000
1500
2000
2500
3000
3500
4000
4500
Flow (cfs)

SJRRP Flow Bench Evaluation

April 2, 2010

The planned flow increase to 1595 cfs at Friant Dam, scheduled for April 2, 2010, will be delayed and reevaluated on Monday, April 12th. Reclamation will request a new flow schedule from the Restoration Administrator to account for the adjustments. The evaluation of the increase is shown below.

As of April 2, 2010:

1. Flows rates from provisional real-time data are below known conveyance thresholds (8,000 cfs in Reach 2A, 1,300 cfs in Reach 2B, and 1,300 cfs in Reach 3).

2. Mendota Pool operations calls identified a potential need to change gate operations at Chowchilla Bifurcation Structure to pass a sand dune through the structure.

3. The seepage hotline received four calls: on March 4th regarding R2B-1, on March 11th regarding an airstrip and pomegranate orchard near river mile 238.5, on March 15th regarding Fort Washington Beach campground, and on March 26th regarding CCID well 144. All evaluations determined the planned releases could proceed.

4. Real-time provisional groundwater data does not show groundwater depths crossing identified thresholds. Water table elevations in all three wells are continuing to increase.

5. Manually monitored groundwater wells do not show unaddressed groundwater depths crossing identified thresholds.

6. Measured losses in Reach 2A from operations estimates show approximately 190 cfs, and are fluctuating.

7. Projected groundwater levels from the upcoming increase in flow are below thresholds except for wells R2B-1, MW-49B, MW-55B, MW-47, and R3-7. MW-55B is predicted to increase above the top of the buffer zone. Hydraulic rating curves are updated based on new modeling information and site evaluations.

8. The LSJLD was notified of potential increases in flows and identified concerns with approaching channel capacity in some reaches. The LSJLD provided information on Monday, March 29th that flows are adjacent to or inundating 12 flapgates and informed Reclamation that the LSJLD would need to increase monitoring activities in these locations.

9. The CCID was notified of potential increases in flows and identified high groundwater levels in CCID monitoring well 144, concerns regarding site evaluation measurements, and concerns about high water surface levels in the river and potential obstructions.

10. The SLCC was notified of potential increases in flows and did not identify any potential issues.

The seepage management plan uses existing groundwater elevations and extrapolates stage changes to estimate future groundwater depths. Prediction accuracy has generally been conservative at about 0.5 feet error. Telemetered data in Reach 2B shows that existing groundwater elevations have not stabilized and may continue to rise by several tenths of a foot. Several wells are within the buffer zone and one is predicted to come within the range of potential damages. The inaccuracy from potential transient effects and prediction error exceeds the margin of safety on the potential damages. Based on past experience, water table elevations in MW-54 will require several additional days to stabilize. By April 12th, the monitoring network should have registered any transient effects and uncertainty will include only prediction error. This will extend this 1100 cfs flow release rate for the same number of days as the previous 800 cfs flowbench.

The recommendation from the Restoration Administrator for the 2010 Interim Flows prioritized evaluating losses. The hydrographs were developed to establish flow benches that allow reaching steady-state equilibrium. The monitoring network shows that additional time would be required to achieve steady-state surface flows as well as groundwater interactions.

At the proposed flow bench, operations at Mendota and Sack Dam will exceed historical experience. Stable flow conditions would allow for more accurate development of operating rules by providing a more certain foundation in preparation for future flow benches. Accurate operating rules will improve the ability to establish future studies in reaches downstream of Mendota and Sack Dams.

The combination of avoiding seepage losses and developing a superior data set requires delaying flow adjustments. The flow bench will be reevaluated on April 12th to determine if the planned increase can proceed.

Data

The weekly groundwater report with manual measurements via electronic well sounder and recent flow data is available at: http://restoresjr.net/activities/if/index.html.

Table 1 shows the anticipated changes in flows used to predict future groundwater depths based on Exhibit B loss assumptions and an estimated 300 cfs delivery to Arroyo Canal.

Table 1: Anticipated Change in Flows

	Current Target (cfs)	Future Target (cfs)	Change (cfs)
Reach 2A	950	1445	495
Reach 2B & 4A	815	1290	475
Reach 3	1115	1590	475

Table 2 shows the current and predicted rise in groundwater based on estimated changes in river stage and the conceptual model shown in Figure 1. Subsequent pages show the rating curves for each of the key wells from the Mussetter Engineering, Inc., 2008. San Joaquin HEC-RAS Model Documentation. Technical Memorandum prepared for California Dept. of Water Resources, Fresno, California, June 2. Rating curves in Reach 2B were updated April 1, 2010.

Table 2: Predicted Increases in Groundwater Levels for Key Wells

Well_ID	Site	Buffer Zone (ft bgs)	Screen Depth (ft bgs)	Current Depth Week of April 4th (ft bgs)[1]	Predicted Stage Increase (ft)	Anticipated Depth (ft)
FA-9	Reach 2A – Transect 12 – Left	4-6	12-32	8.6	0.698	7.9
MW-47	**Reach 2A – Transect 12 – Right**	**6-8**	**20-40**	**7.97**	**0.698**	**7.3**
MA-4	Reach 2A – Transect 13 – Right	6-8	15-25	11.35	0.8782	10.5
MW-49B	**Reach 2A – Transect 13 – Left**	**4-6**	**10-20**	**5.15**	**0.8782**	**4.3**
MW-54B	Reach 2B – San Mateo Ave. – Right	TBD	TBD	15.03	1.8412	13.2
MW-55B	**Reach 2B – San Mateo Ave. – Left**	**6-8**	**10-15**	**6.96**	1.8412	**5.1**
R2B-1	**Reach 2B – Right**	**4-6**	**8-11**	**5.53**	**0.6195**	**4.9**
R2B-2	Reach 2B – Right	4-6	17-20	12.33	0.0749	12.3
R3-1	Reach 3 – Right	4-6	9-24	7.98	1.8746	6.1
R3-6	Reach 3 – Right	4-6	17-20	8.00	1.4018	6.6
R3-7	**Reach 3 – Right**	**3-5**	**17-20**	**6.48**	**1.6996**	**4.8**
MW-84	Reach 4A – Highway 152 – Right	4-6	32-52	31.88	1.3982	30.5
MW-87B	Reach 4A – Highway 152 - Left	4-6	TBD	Dry (>14)	1.3982	12.6 to dry

[1] Wells in Reaches 2A and 2B were measured on Tuesday, March 30th, wells in Reaches 3 and 4A were measured on Thursday, April 1st.

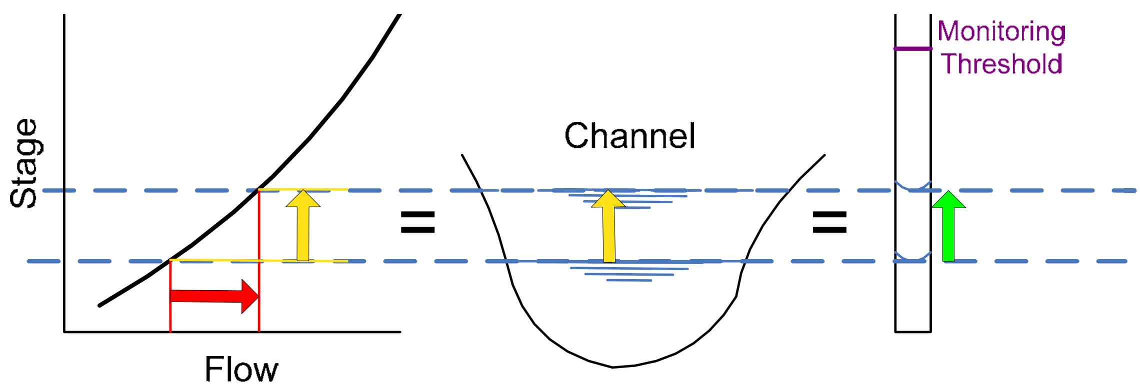
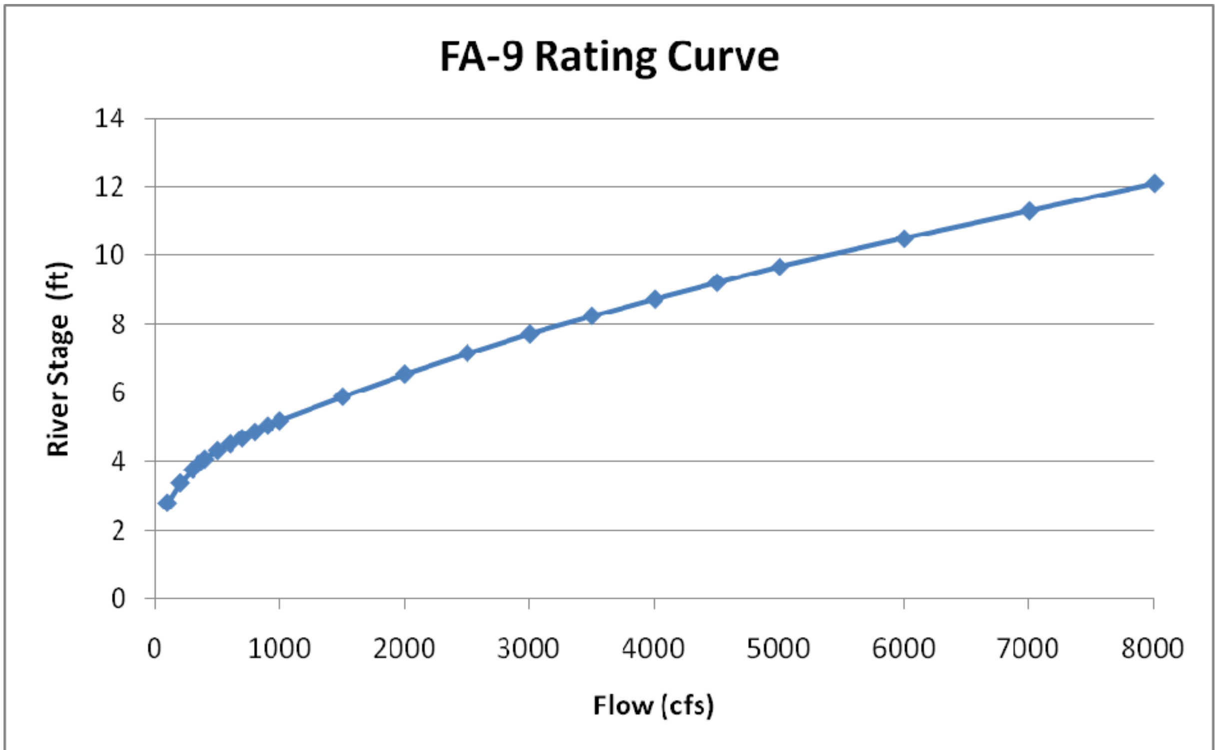
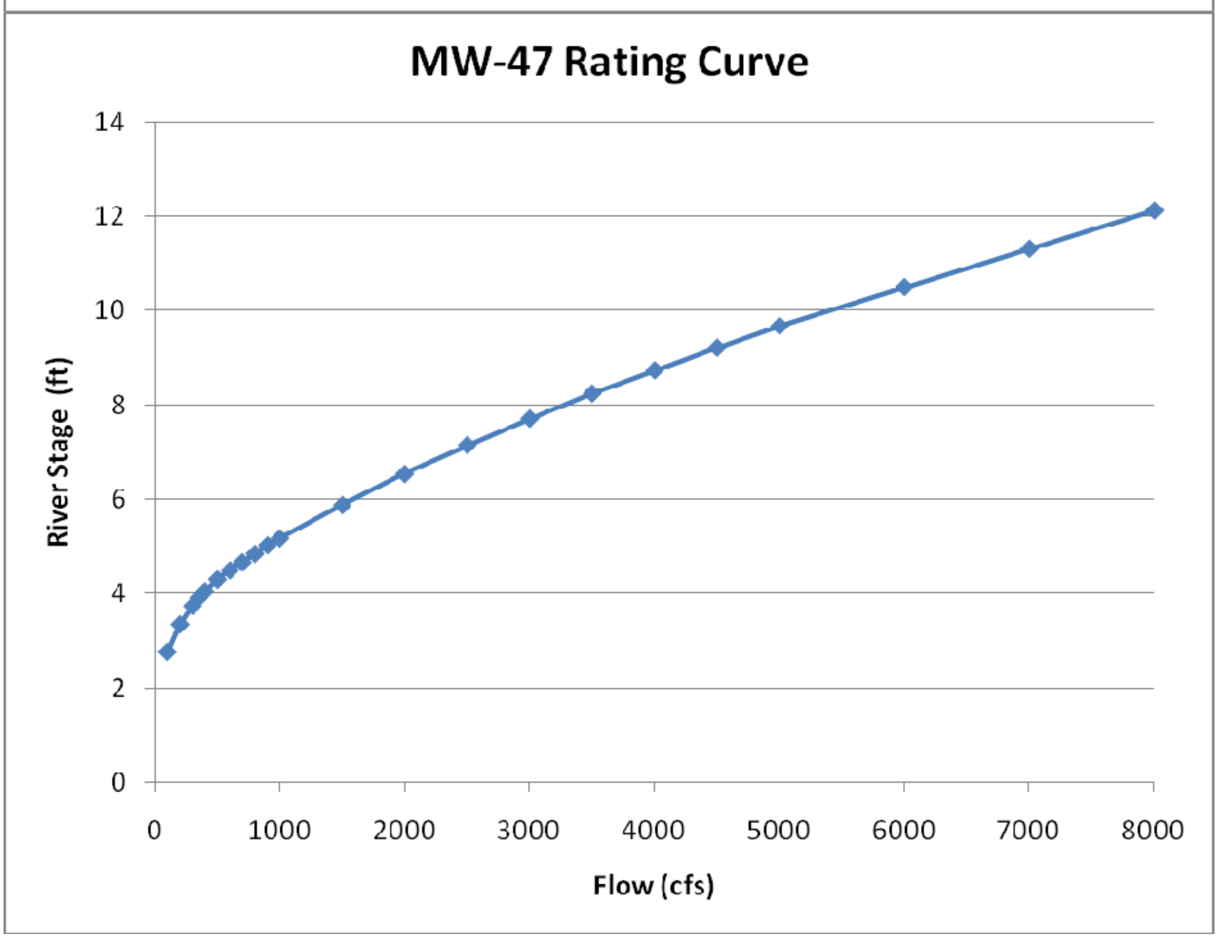
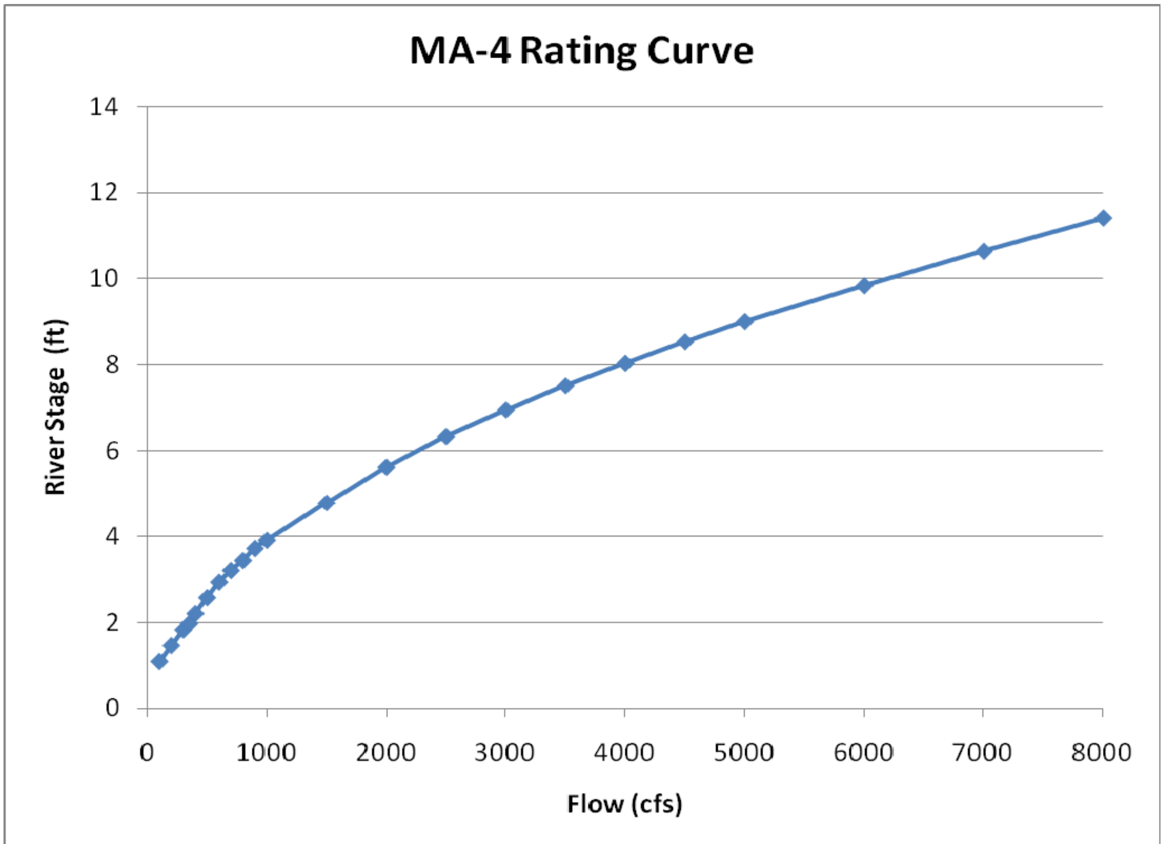


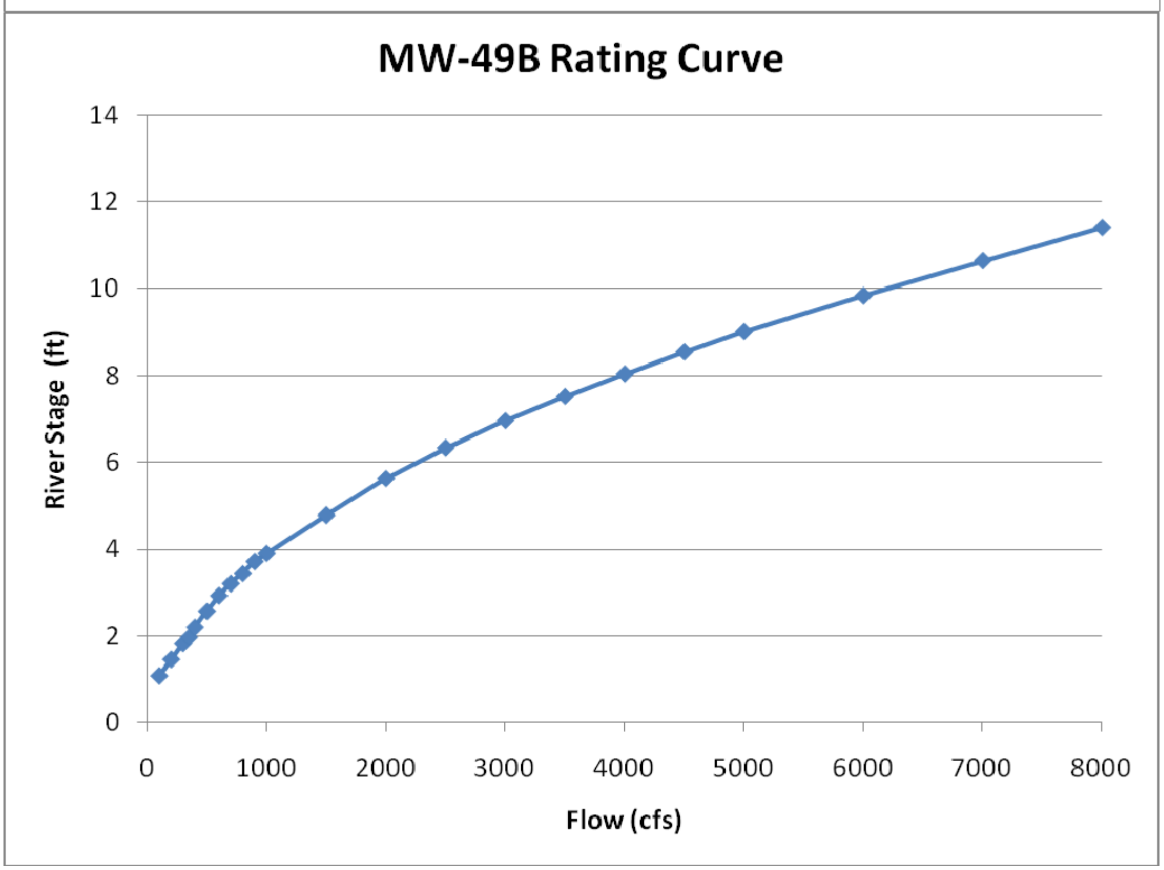
Figure 1: Conceptual Model for Flow Bench Evaluations Estimated Groundwater Depths


FA-9 Rating Curve
River Stage (ft)
14
12
10
8
6
4
2
0
0
1000
2000
3000
4000
5000
6000
7000
8000
Flow (cfs)

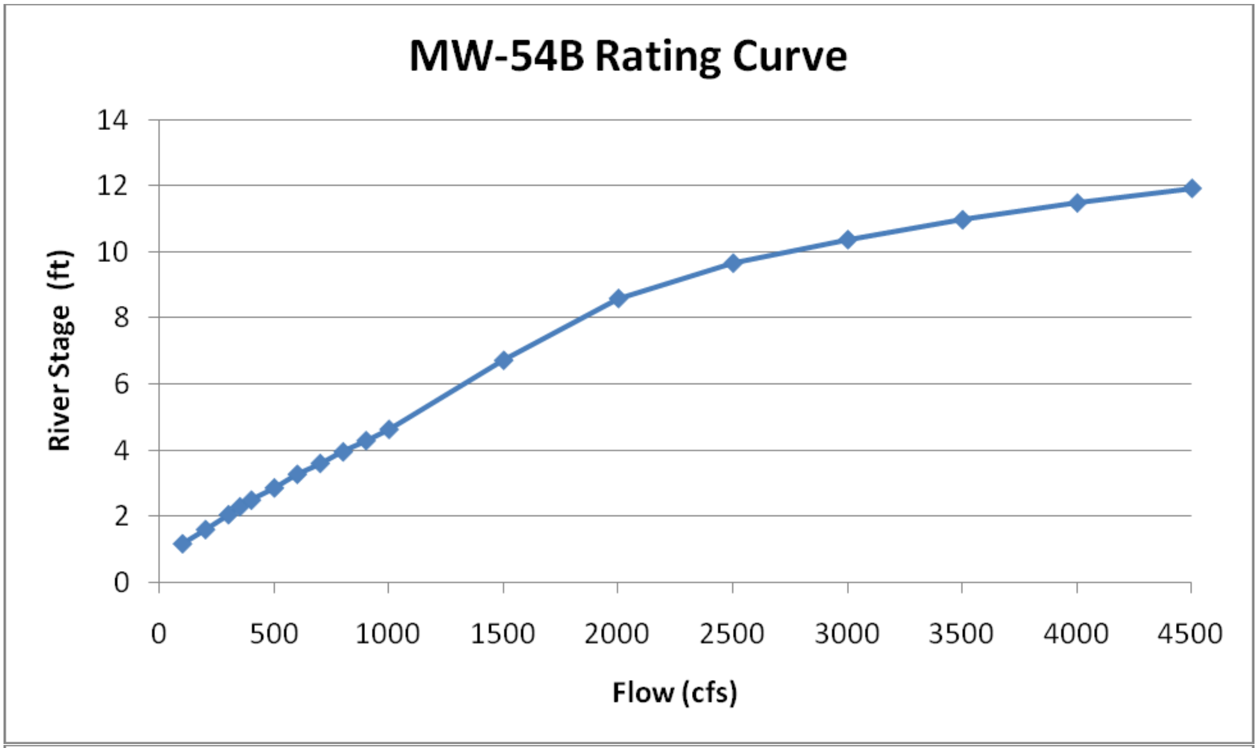

MW-47 Rating Curve
River Stage (ft)
14
12
10
8
6
4
2
0
0
1000
2000
3000
4000
5000
6000
7000
8000
Flow (cfs)

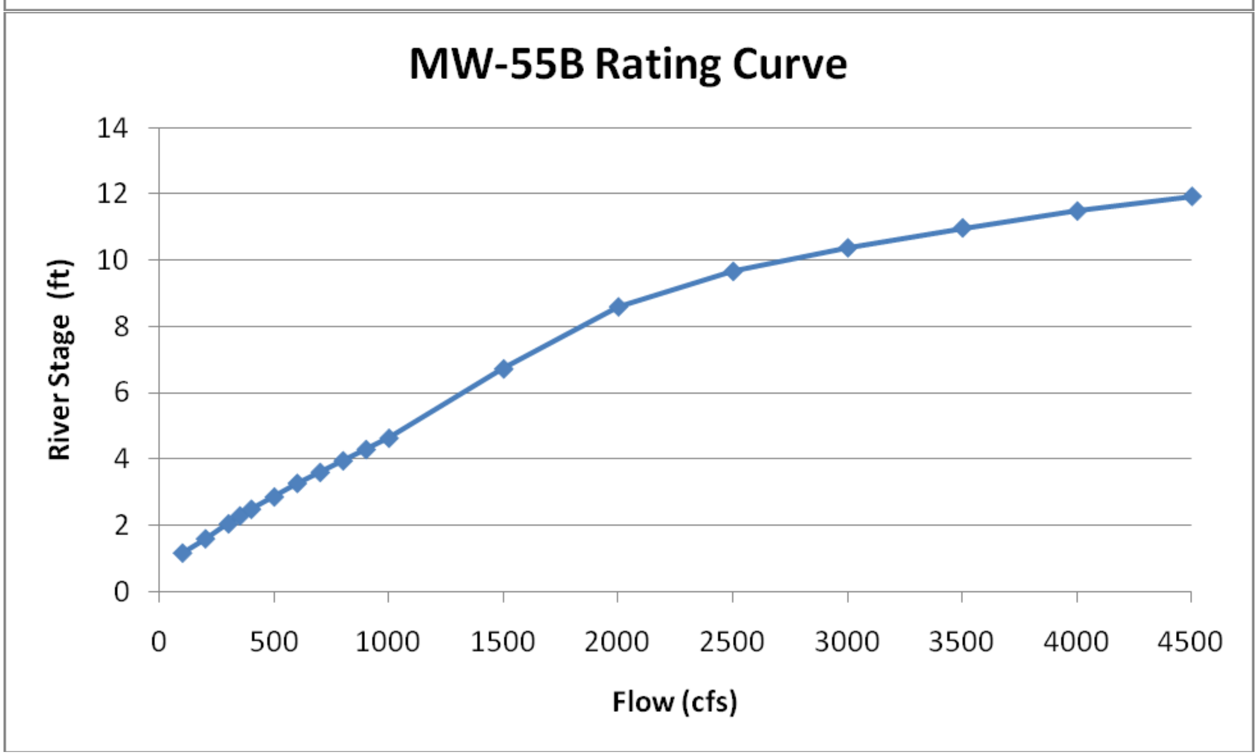


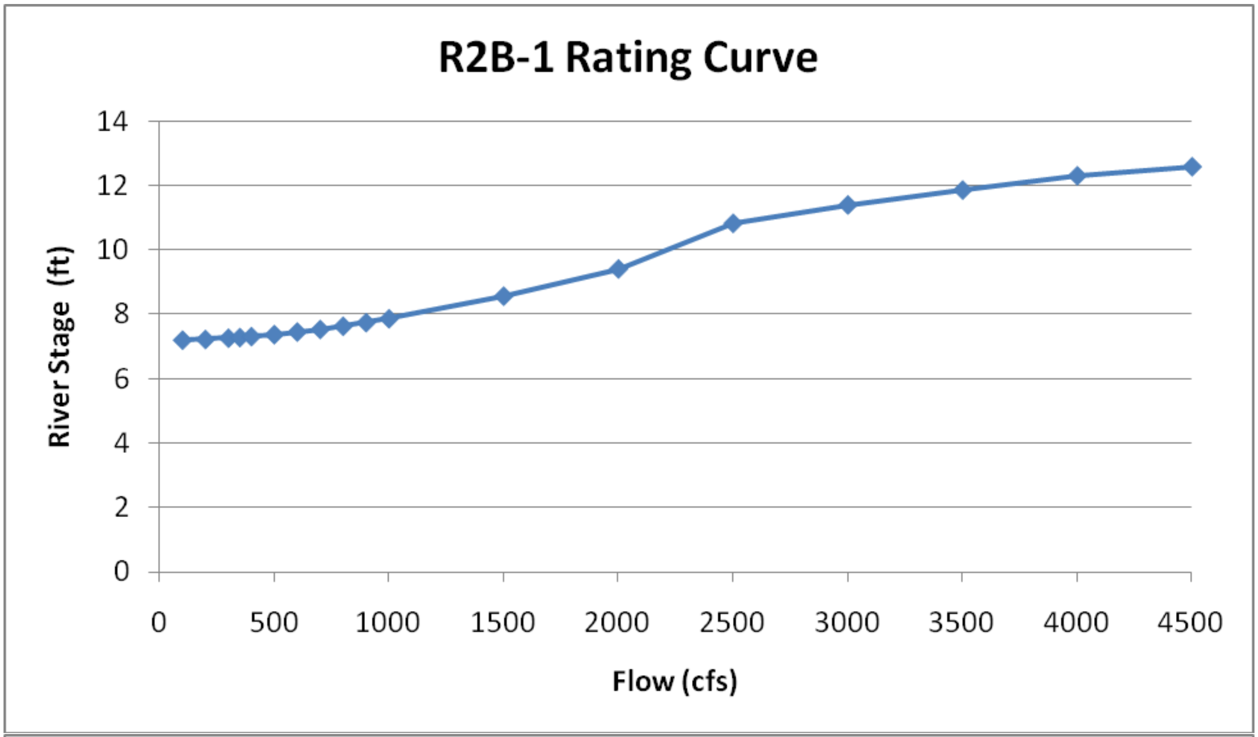
MA-4 Rating Curve
River Stage (ft)
Flow (cfs)
0
2
4
6
8
10
12
14
0
1000
2000
3000
4000
5000
6000
7000
8000

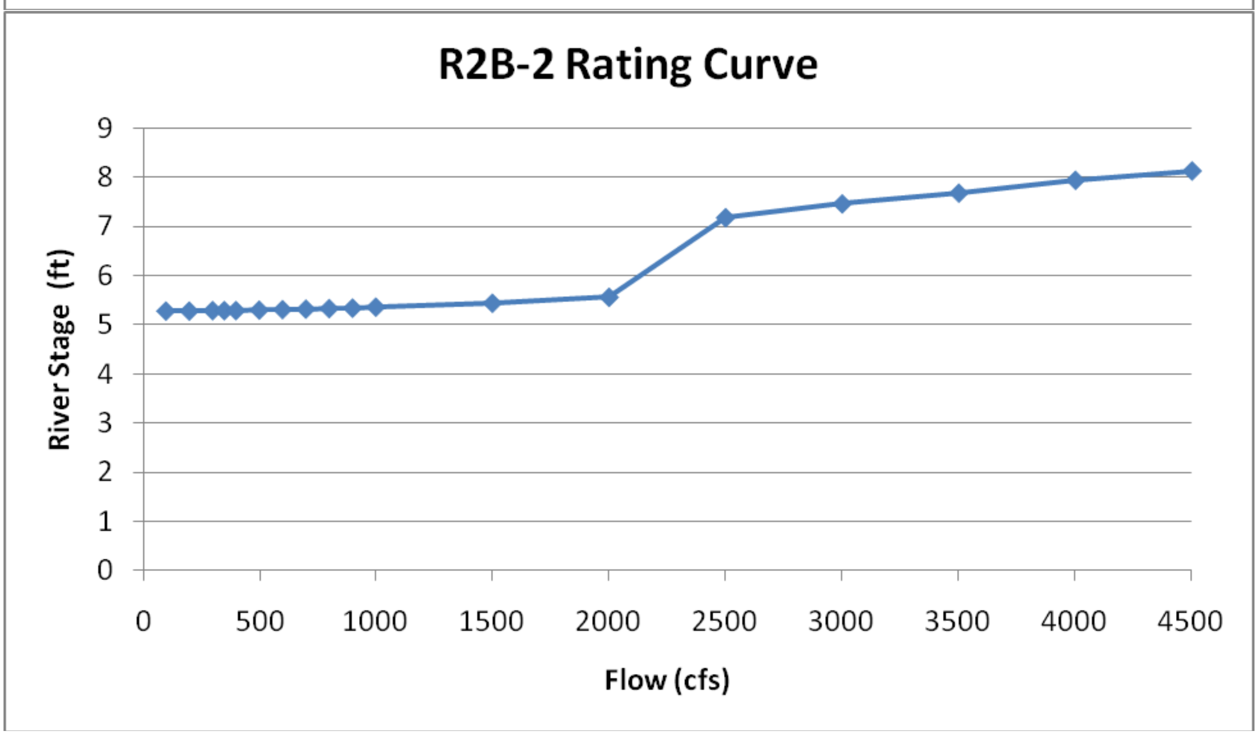


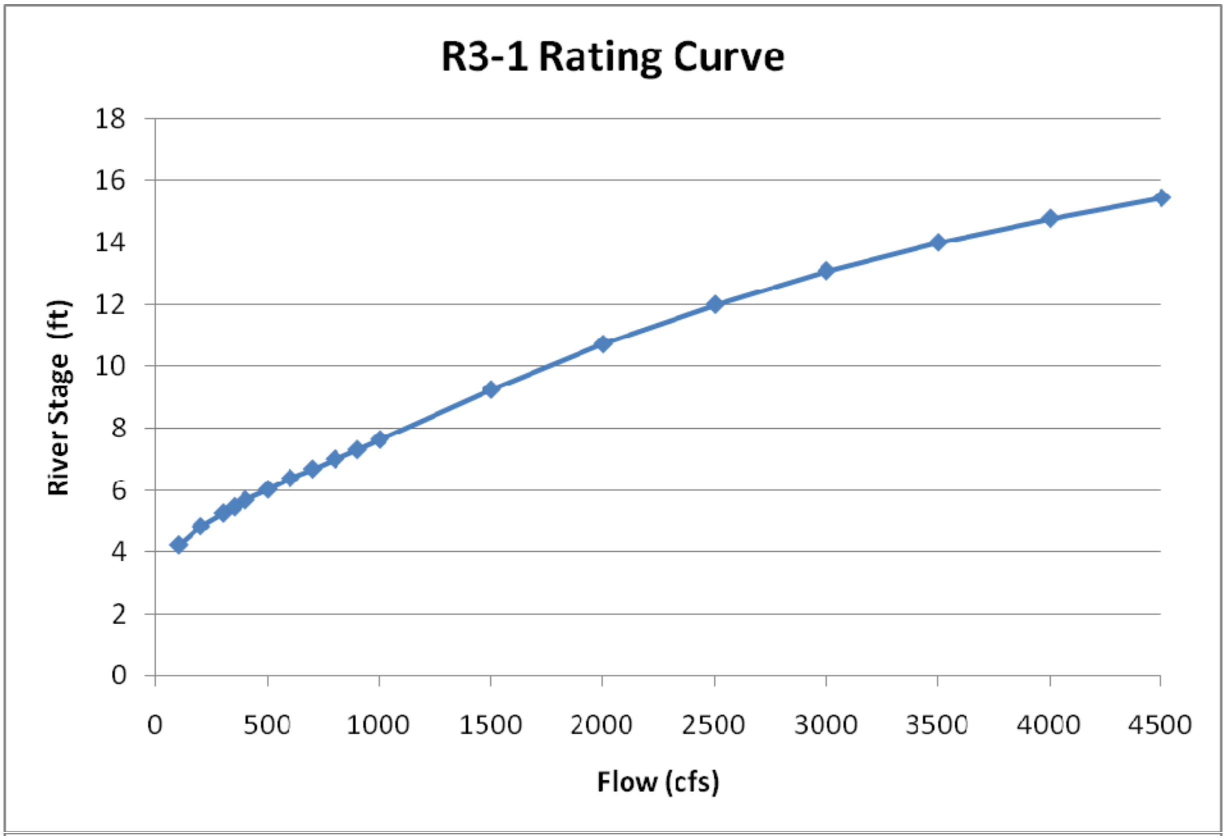
MW-49B Rating Curve
River Stage (ft)
Flow (cfs)
0
2
4
6
8
10
12
14
0
1000
2000
3000
4000
5000
6000
7000
8000

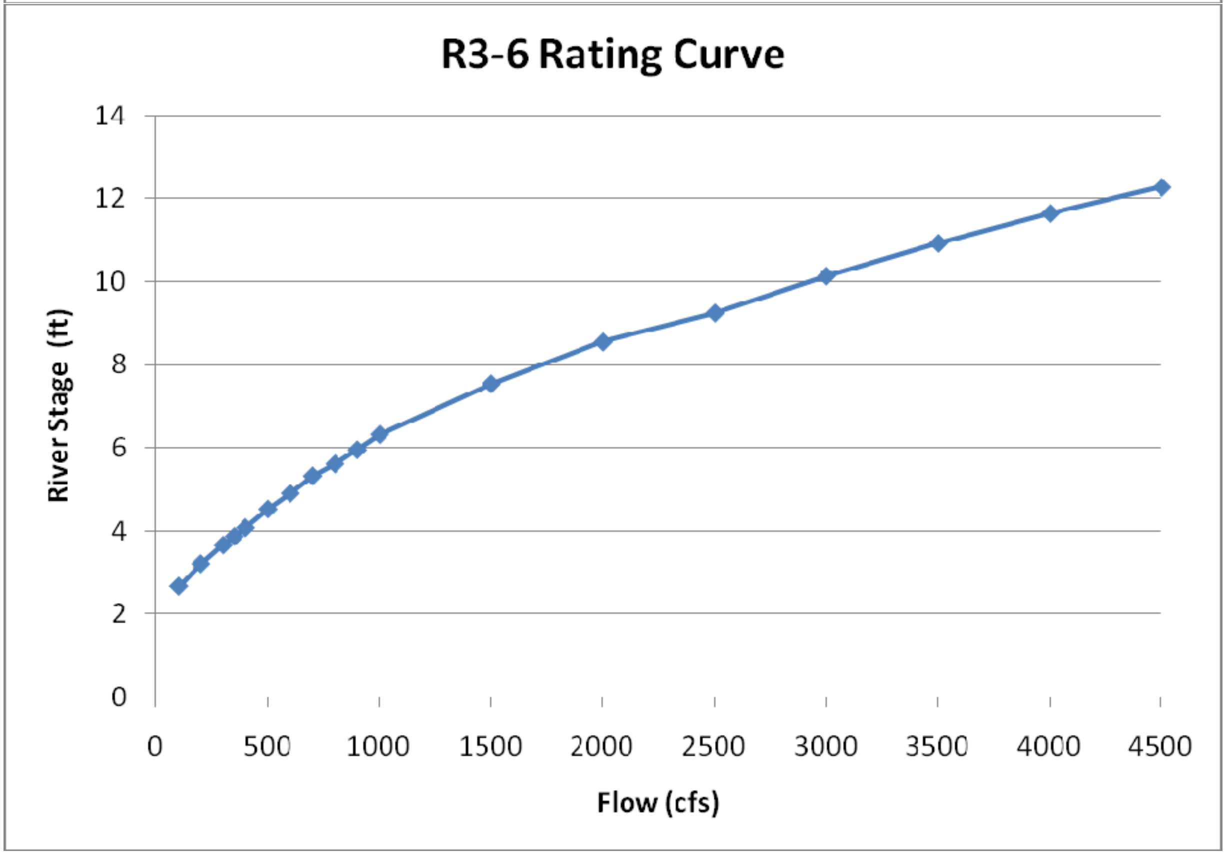

MW-54B Rating Curve
River Stage (ft)
Flow (cfs)
0
2
4
6
8
10
12
14
0
500
1000
1500
2000
2500
3000
3500
4000
4500

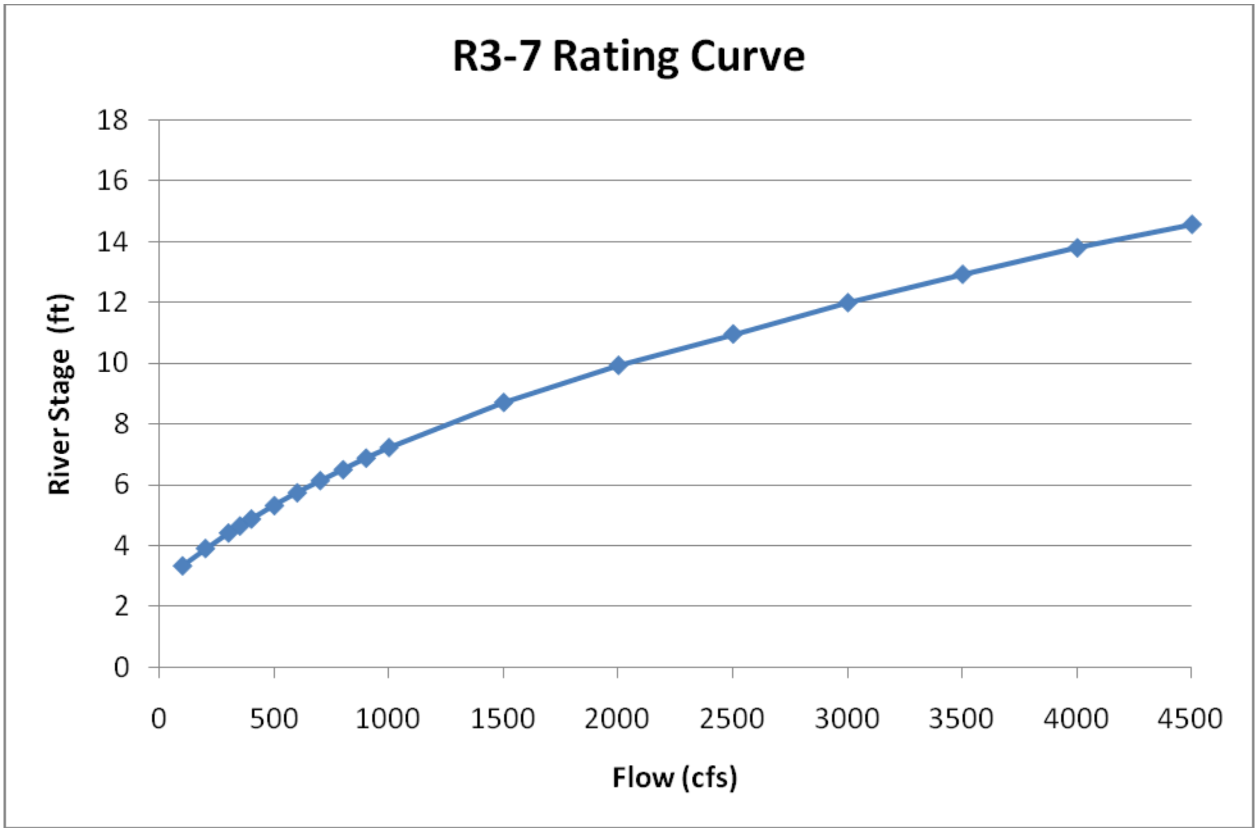

MW-55B Rating Curve
River Stage (ft)
Flow (cfs)
0
2
4
6
8
10
12
14
0
500
1000
1500
2000
2500
3000
3500
4000
4500

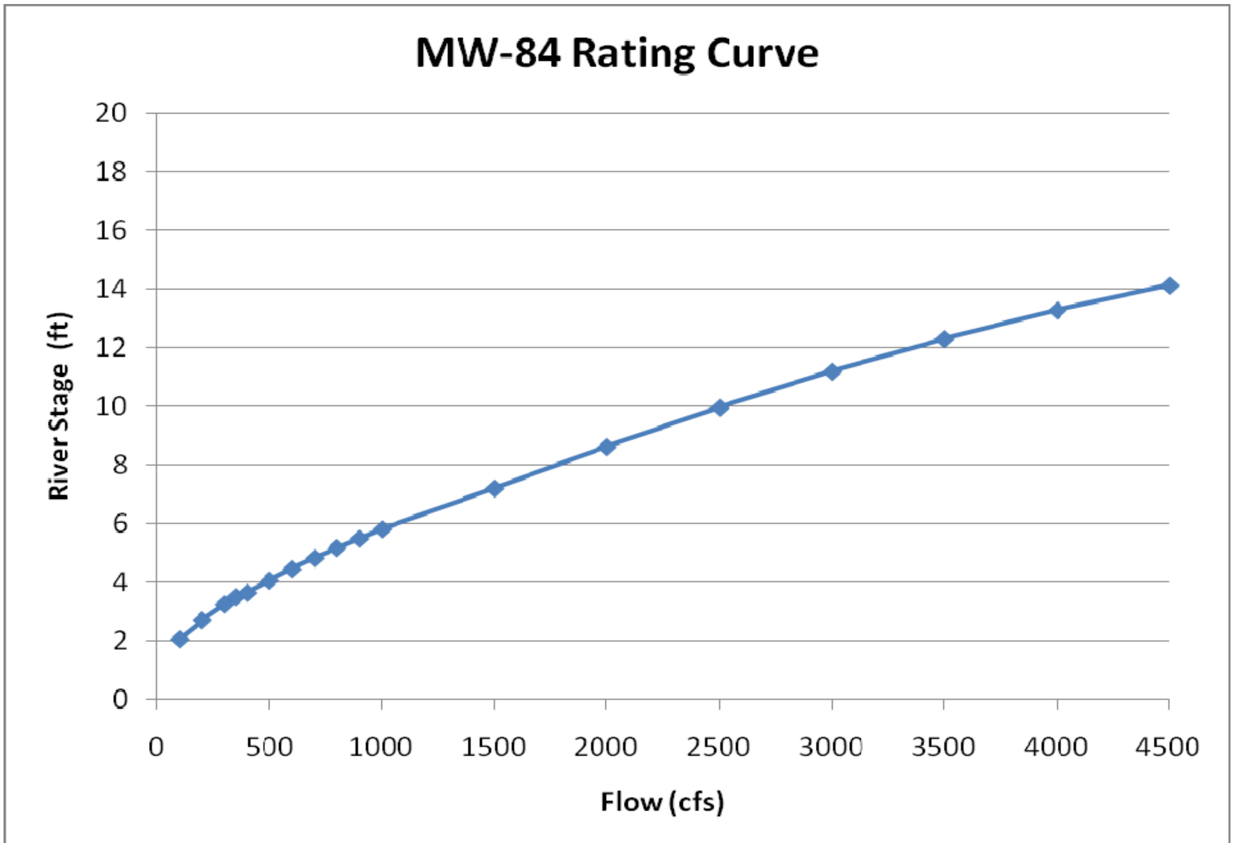

R2B-1 Rating Curve
River Stage (ft)
14
12
10
8
6
4
2
0
0
500
1000
1500
2000
2500
3000
3500
4000
4500
Flow (cfs)

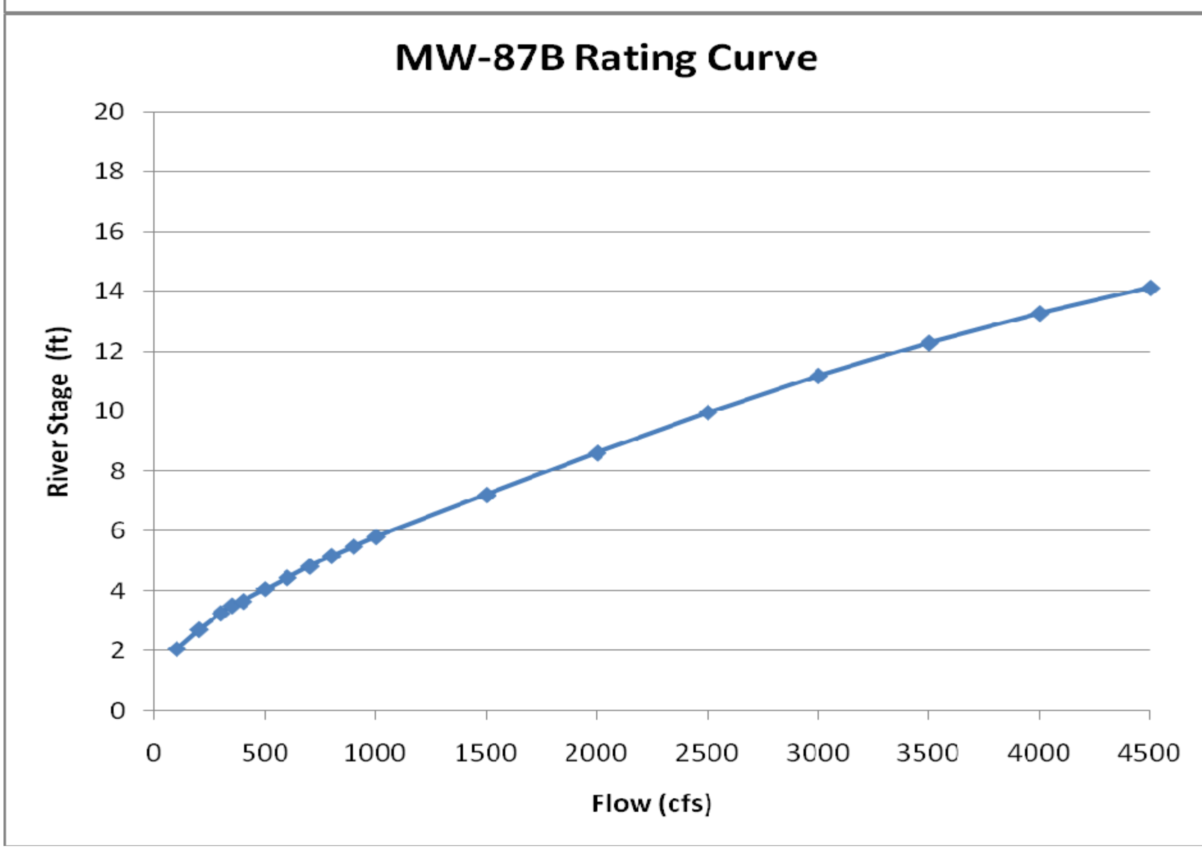

R2B-2 Rating Curve
River Stage (ft)
9
8
7
6
5
4
3
2
1
0
0
500
1000
1500
2000
2500
3000
3500
4000
4500
Flow (cfs)


R3-1 Rating Curve
River Stage (ft)
Flow (cfs)
0
2
4
6
8
10
12
14
16
18
0
500
1000
1500
2000
2500
3000
3500
4000
4500


R3-6 Rating Curve
River Stage (ft)
Flow (cfs)
0
2
4
6
8
10
12
14
0
500
1000
1500
2000
2500
3000
3500
4000
4500


R3-7 Rating Curve
River Stage (ft)
Flow (cfs)
0
2
4
6
8
10
12
14
16
18
0
500
1000
1500
2000
2500
3000
3500
4000
4500


MW-84 Rating Curve
20
18
16
14
12
10
8
6
4
2
0
River Stage (ft)
0
500
1000
1500
2000
2500
3000
3500
4000
4500
Flow (cfs)


MW-87B Rating Curve
20
18
16
14
12
10
8
6
4
2
0
River Stage (ft)
0
500
1000
1500
2000
2500
3000
3500
4000
4500
Flow (cfs)

SJRRP Flow Bench Evaluation

April 12, 2010

The April 2nd SJRRP flow bench evaluation identified additional time required for groundwater conditions to equilibrate prior to the 1600 cfs flow bench in the 2010 Interim Flow Recommendation. Evaluation of increasing flows from Friant Dam from 1100 cfs to 1600 cfs on April 12, 2010 determined:

1. Friant Dam releases can be increased to 1600 cfs with partial recapture at Mendota Pool. Release should be reduced by anticipated Cottonwood and Little Dry Creek inflows so as not to exceed 1300 cfs at the Chowchilla Bifurcation Structure.
2. Sack Dam releases should be maintained at 700 cfs due to potential Reach 4 seepage impacts.
3. Mendota Dam can release water to meet the 700 cfs flow target at Sack Dam and limit releases for the SJRRP such that the combined releases for Interim Flows and Arroyo Canal deliveries do not exceed 1300 cfs.

Daily evaluations per the water right order will continue throughout the bench to consider potential needs for flow reductions.

As of April 12, 2010:

1. Flows rates from provisional real-time data are below known conveyance thresholds (8,000 cfs in Reach 2A, 1,300 cfs in Reach 2B, and 1,300 cfs in Reach 3).
2. Mendota Pool operations calls did not identify any issues.
3. The seepage hotline received six calls, described below. All evaluations determined the planned releases from Friant could proceed but that flows over the Sack Dam should be limited, due to seepage concerns within Reach 4, to 700 cfs and Fort Washington Beach in Reach 1 will likely become inundated as described in hotline call #3.
4. Real-time provisional groundwater data does not show groundwater depths crossing identified thresholds.
5. Manually monitored groundwater wells do not show unaddressed groundwater depths crossing identified thresholds. CCID maintained shallow groundwater observation wells show high groundwater depths as reported below.
6. Measured losses in Reach 2A from operations estimates show approximately 240 cfs. Changes in flows below Sack Dam appear to be stabilizing based on CDEC stage telemetry.
7. Projected groundwater levels from the upcoming increase in flow to 1600 cfs are below the top of the buffer zone except for wells R2B-1, MW-49B and MW-55B.
8. The LSJLD was notified of potential increases in flows. The LSJLD provided information on March 29th that flows are adjacent to or inundating 12 flapgates and informed Reclamation that the LSJLD would need to increase monitoring activities in these locations. Merced County's Dan McNamara Road crossing of the Eastside Bypass is unpassable and has been posted, placing public access along the right levee of the Eastside Bypass for County connections.

9. The CCID provided groundwater monitoring information in anticipation of the 1600 cfs flow bench evaluation. A conference call on April 10th between Reclamation and the General Manger reviewed data on 25 wells compared to historical conditions when available. CCID recommended not increasing flows into Reach 3 and performing necessary evaluations to determine if a flow reduction in warranted.

10. The SLCC was notified of potential increases in flows and did not identify any potential issues.

Seepage hotline call #1 was placed on March 4, 2010 regarding Monitoring Well R2B-1. The most recent measurement recorded a 1.3 foot increase in groundwater level for the past week. Flows into Mendota Pool remained stable over this time period. Field observations identified recent flood irrigation. Although evaluation using the most recent groundwater data would indicated a rise beyond the buffer zone, evaluation of available data suggests the most recent groundwater depth likely represents irrigation practices rather than influence from river conditions. Using prior measurements, groundwater levels are not predicted to increase past the top of the buffer zone. Observations on the morning of April 12th measured a depth below ground surface of 4.62 feet further supporting this conclusion. Flood irrigation had ceased but standing water remained in the irrigation ditch. Figure 1 below plots groundwater level in R2B-1 and Mendota Pool stage. The proximity to Mendota Dam and the operation of Mendota Pool to a constant elevation provides additional confidence that planned releases can occur.

Seepage hotline call #2 was placed on March 11, 2010 regarding potential seepage in a pomegranate orchard and addressed through the March 16th evaluation. Conditions do not warrant changing the evaluation. Planned releases can occur.

Seepage hotline call #3 was placed on March 15, 2010 regarding future potential flooding at Fort Washington Beach campground and addressed through the March 16th evaluation. 1100 cfs was the owner's estimated maximum flow before flooding. A follow-up call on April 11th described that flows are likely to inundate 9-10 acres of a total of 11 acres of campgrounds that will require a dry-out period prior to returning to a usable state.

Seepage hotline call #4 was emailed on March 26, 2010 regarding groundwater levels in CCID monitoring well 144 in reach 4A with reported levels near the top of the buffer zone. A site evaluation was conducted on March 29. This bench evaluation continues prior release rates in this Reach.

Seepage hotline call #5 was emailed on April 3, 2010 regarding water in seep drains around Jim Nickel's property in Reach 4B. The site was evaluated and found to have water table elevations beneath the field from 4.3 – 8 feet below ground surface. The proposed buffer zone for alfalfa and tomatoes, the applicable crops in this field, is 4-6 feet below ground surface. Evaluation determined that further increases in San Joaquin River flows through Reach 4A may risk seepage impacts. A reduction in flows in this area would likely complicate the data collection efforts of the SJRRP, but would not reduce the risk of impact. Mr. Nickel called the seepage hotline the morning of April 10th to discuss the site, which was recorded as seepage hotline call #6. A follow-up call by Reclamation on the evening of April 10th discussed the evaluation process.

Monitoring Well R2B-1 is measured within 0.6 feet of the top of the buffer zone. Seepage Hotline Call #1 provides an evaluation. Planned releases can proceed.

Monitoring Well 49B in Reach 2A measured groundwater depths 0.5 feet below the top of the buffer zone and likely to rise above the buffer with a 1600 cfs release from Friant Dam. The flow bench evaluation was designed to conservatively overestimate the potential for seepage impacts and identify areas requiring more detailed site specific consideration. A site evaluation at this location found a steep groundwater slope away from the river, on the order of a half foot of groundwater elevation decrease for every one hundred feet away from the river. Levels in the monitoring well above the top of the buffer zone will not result in groundwater levels in the fields that are above the top of the buffer zone. There are also protective drains in this area as backup. Planned releases can proceed.

Monitoring Well 55B, at San Mateo Road on the left bank, is measured within 0.33 feet of the top of the buffer zone. The rating curve for estimating groundwater levels was updated from manual measurements taken at San Mateo Road and predicts a rise to 5 feet below ground surface. A site investigation and evaluation on March 29th identified a groundwater table sloping down, away from the river to depths of 20 feet bgs. Crops consist of young palm trees near the river and pistachios farther inland. Young trees are unlikely to have extensive root systems and pistachios are salt tolerant. Reclamation staff met with the landowner – Baker Farms – on April 9, 2010 to discuss allowing groundwater levels to potentially rise up to 5 feet below ground surface. The landowner did not identify concerns with the proposed increase.

Monitoring Well 47, in Reach 2A, shows encroachment into the buffer zone. A site investigation and evaluation is underway. The groundwater level is not predicted to exceed the top of the buffer zone. Planned releases can occur.

Data

The weekly groundwater report with manual measurements via electronic well sounder and recent flow data is available at: http://restoresjr.net/activities/if/index.html.

Table 1 shows the anticipated changes in flows used to predict future groundwater depths based on Exhibit B loss assumptions and a Reach 3 capacity limitation.

Table 1: Anticipated Change in Flows

	Current Target (cfs)	Future Target (cfs)	Change (cfs)
Reach 2A	955	1445	490
Reach 2B	820	1300	480
Reach 3	1120	1300	180
Reach 4A	820	700	-120

Table 2 shows the current and predicted rise in groundwater based on estimated changes in river stage and the conceptual model shown in Figure 2. Subsequent pages show the rating curves for each of the key wells. (Mussetter Engineering, Inc., 2008. *San Joaquin HEC-RAS Model Documentation*. Technical Memorandum prepared for California Dept. of Water Resources, Fresno, California, June 2). Rating curves were updated April 9, 2010 for MW-55B to include a linear trend rating curve developed from Reclamation's manually measured stage-discharge data that better fits historical groundwater level rise and reduces the conservatism from the model results.

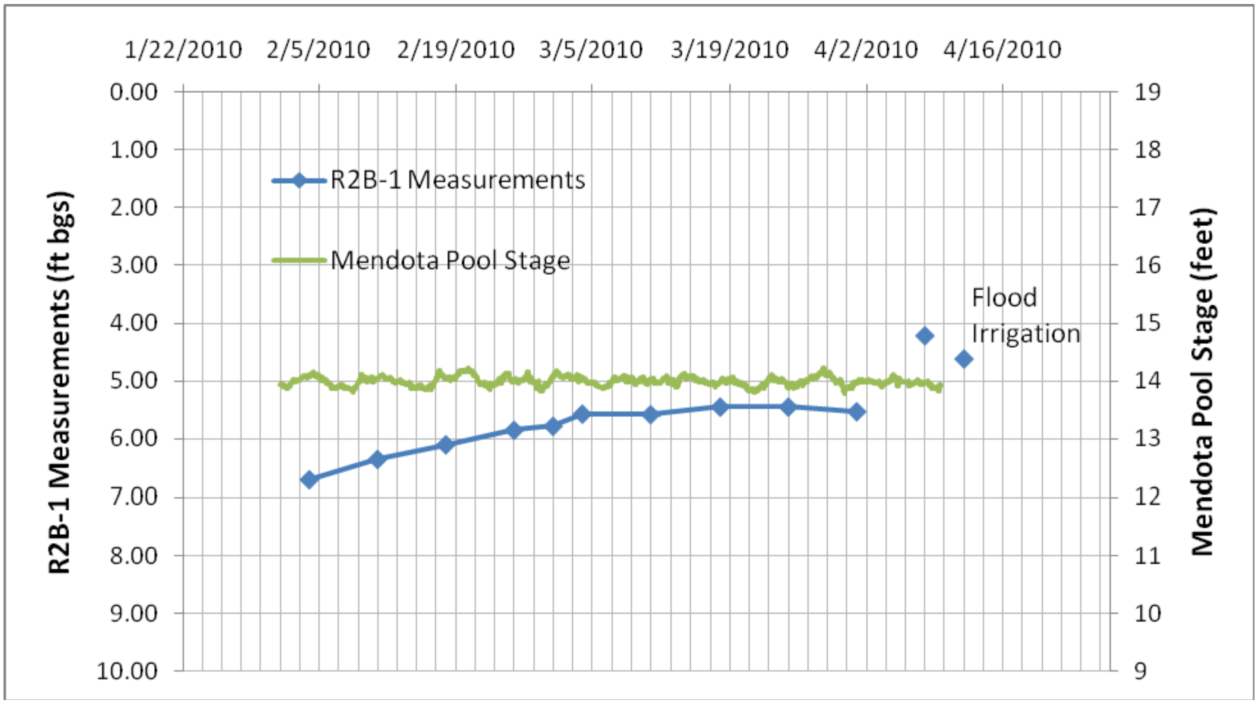


Figure 1 Comparison of Monitoring Well R2B-1 and Mendota Pool Stage

Table 2: Predicted Increases in Groundwater Levels for Key Wells

Well_ID	Site	Buffer Zone (ft bgs)	Screen Depth (ft bgs)	Current Depth Week of April 4th (ft bgs)[1]	Predicted Stage Increase (ft)	Anticipated Depth (ft)
FA-9	Reach 2A – Transect 12 – Left	4-6	12-32	7.98	0.7045	7.3
MW-47	**Reach 2A – Transect 12 – Right**	**6-8**	**20-40**	**7.42**	**0.7045**	**6.7**
MA-4	Reach 2A – Transect 13 – Right	6-8	15-25	11	0.8863	10.1
MW-49B	**Reach 2A – Transect 13 – Left**	**4-6**	**10-20**	**4.52**	**0.8863**	**3.6**
MW-54B	Reach 2B – San Mateo Ave. – Right	TBD	TBD	12.53	1.406	11.1
MW-55B	**Reach 2B – San Mateo Ave. – Left**	**6-8**	**10-15**	**6.33**	**1.406**	**4.9**
R2B-1[2]	**Reach 2B – Right**	**4-6**	**8-11**	**5.5[2]**	**0.628**	**4.9**
R2B-2	Reach 2B – Right	4-6	17-20	12.09	0.076	12.0
R3-1	Reach 3 – Right	4-6	9-24	7.83	0.966	6.9
R3-6	Reach 3 – Right	4-6	17-20	7.37	0.732	6.6
R3-7	Reach 3 – Right	3-5	17-20	5.75	0.888	4.9
MW-84	Reach 4A – Highway 152 – Right	4-6	32-52	29.45	0	29.45
MW-87B	Reach 4A – Highway 152 – Left	4-6	TBD	Dry (>14)	0	Dry

[1] Wells in Reaches 2A were measured on Tuesday, April 6th; MW-54B and MW-56B were measured on Wednesday, April 7th; R2B-1, R2B-2, and wells in Reaches 3 and 4A were measured on Thursday, April 8th.
[2] Calculations used the measurement from the week of April 3rd. April 10th readings measured depth below ground surface of 4.22 feet due to flood irrigation. Observations the morning of April 12th found depths of 4.62 feet with some standing water in the flood irrigation ditch.

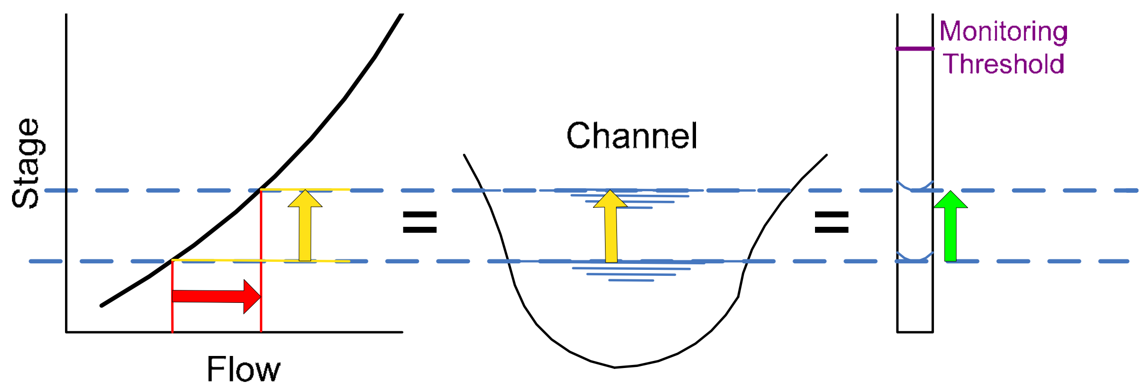
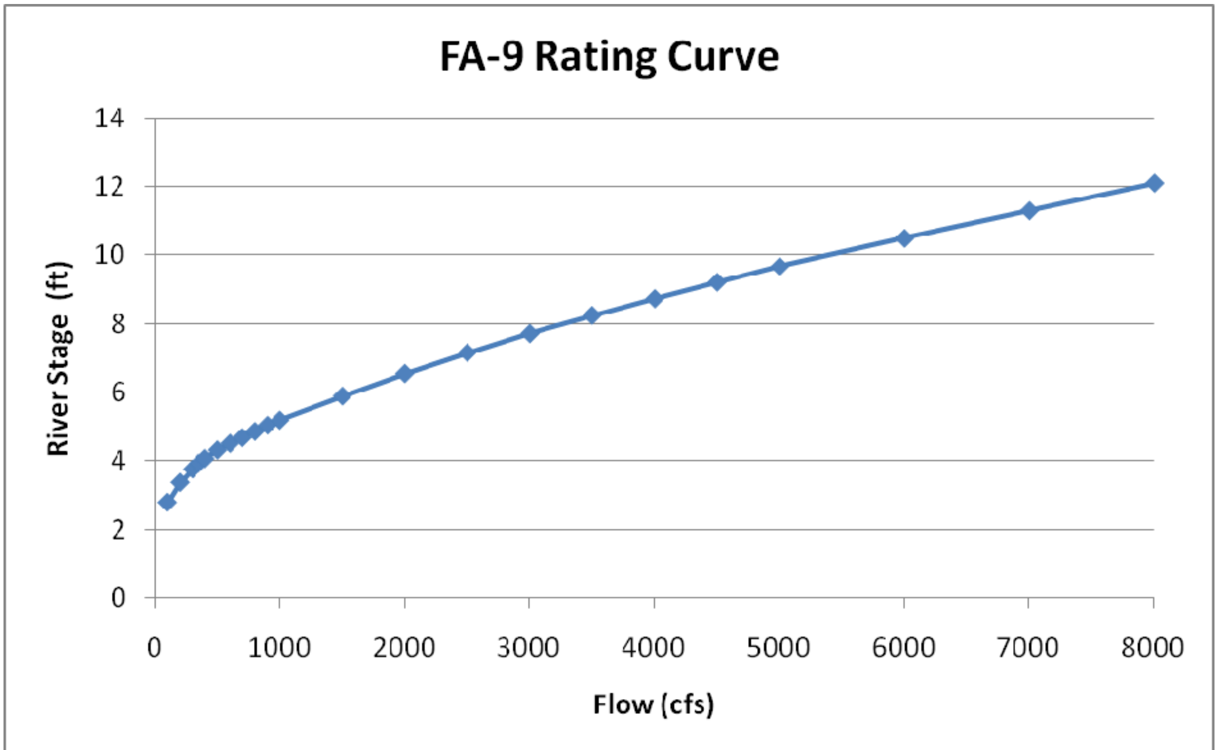
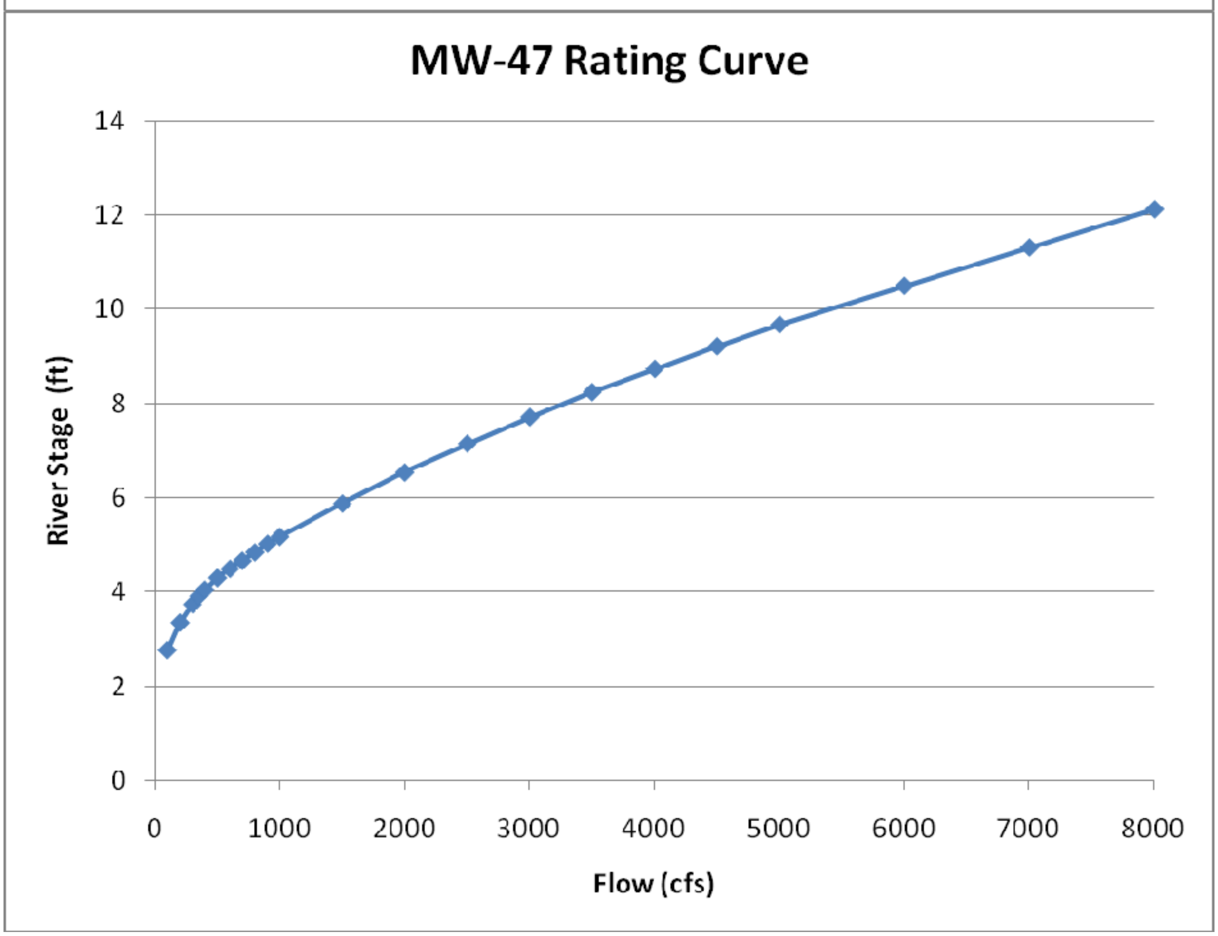
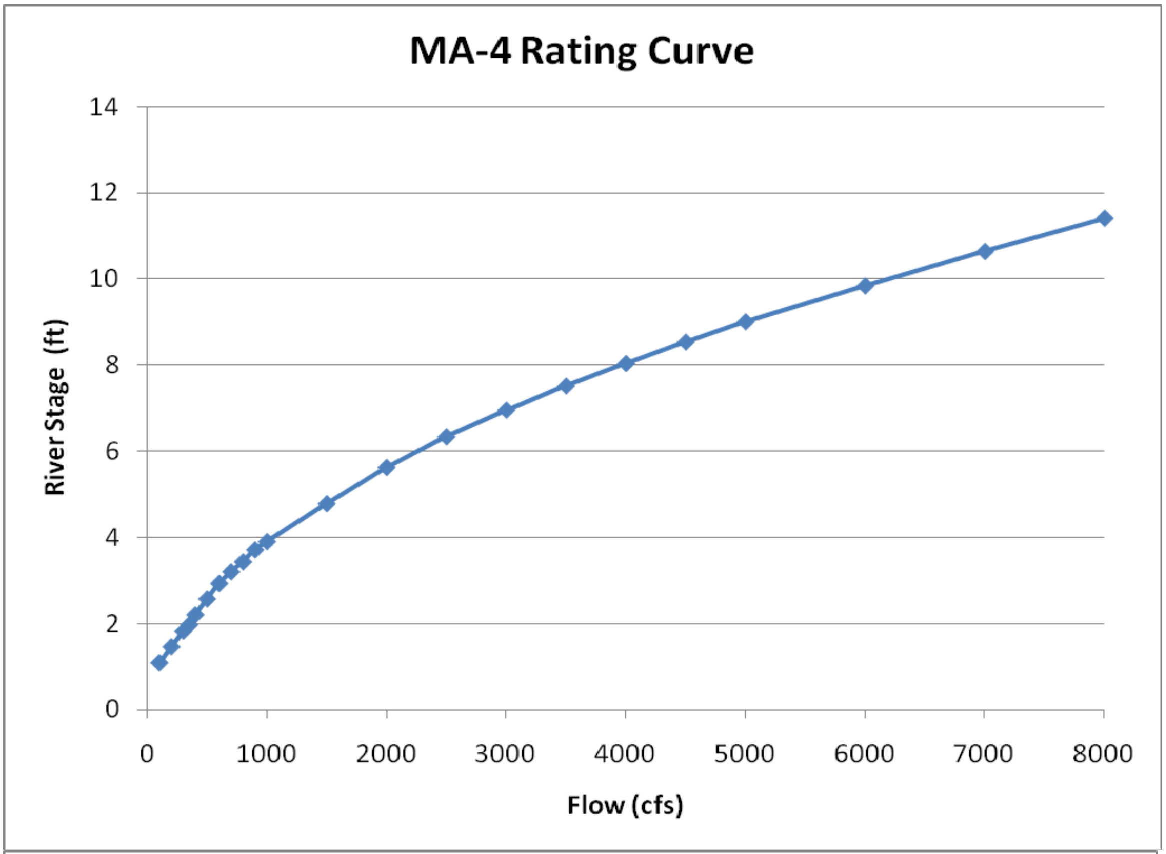
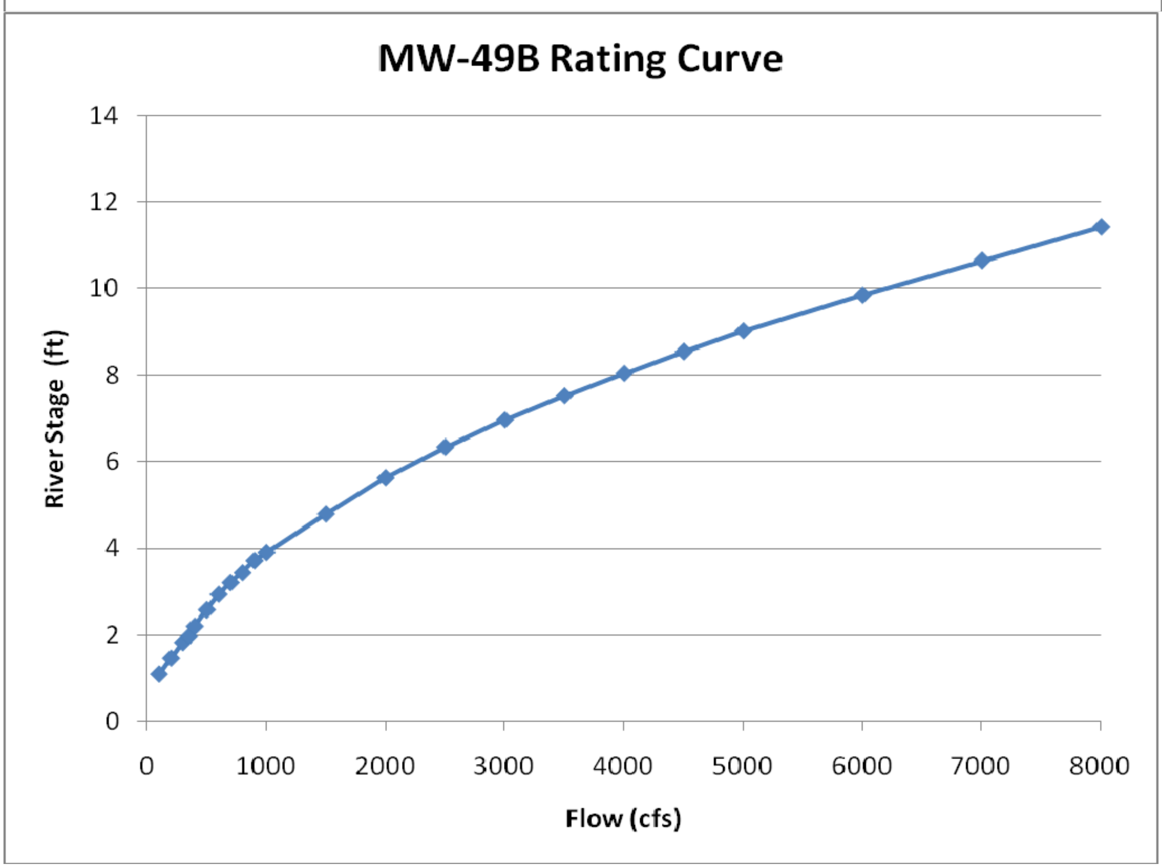


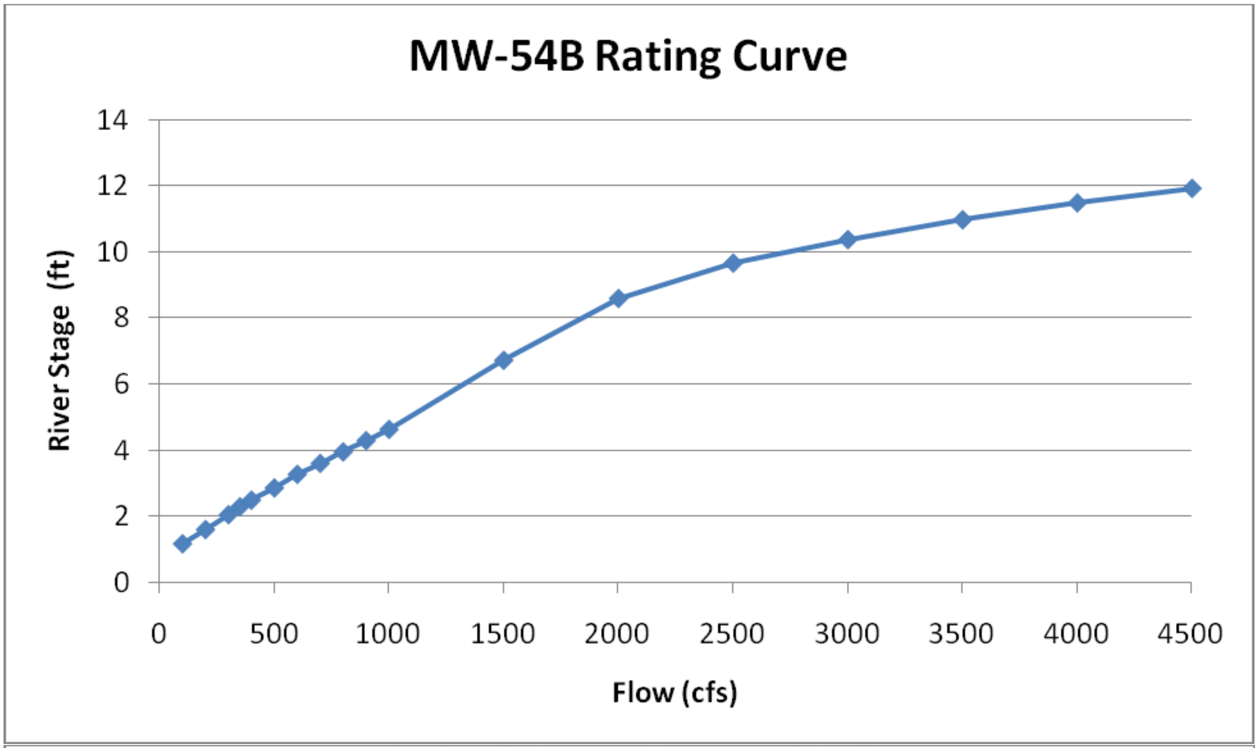
Figure 2: Conceptual Model for Flow Bench Evaluations Estimated Groundwater Depths

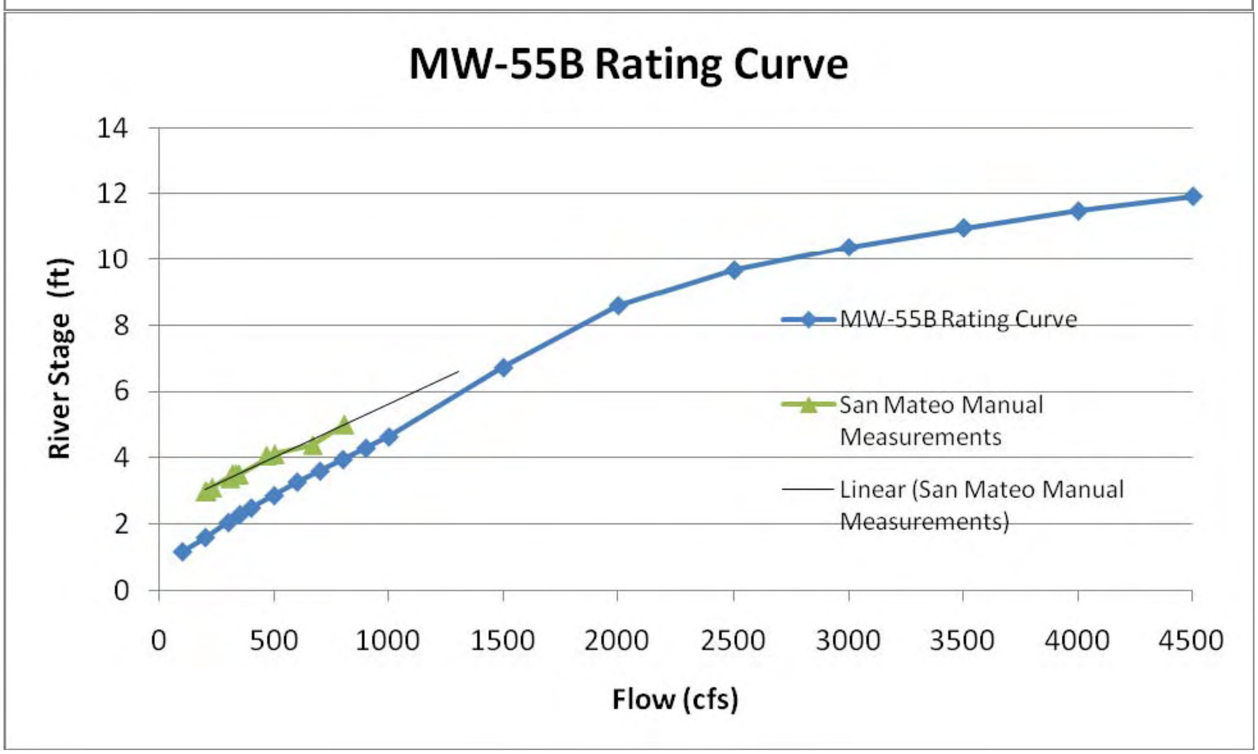

FA-9 Rating Curve
River Stage (ft)
Flow (cfs)
0
2
4
6
8
10
12
14
0 1000 2000 3000 4000 5000 6000 7000 8000

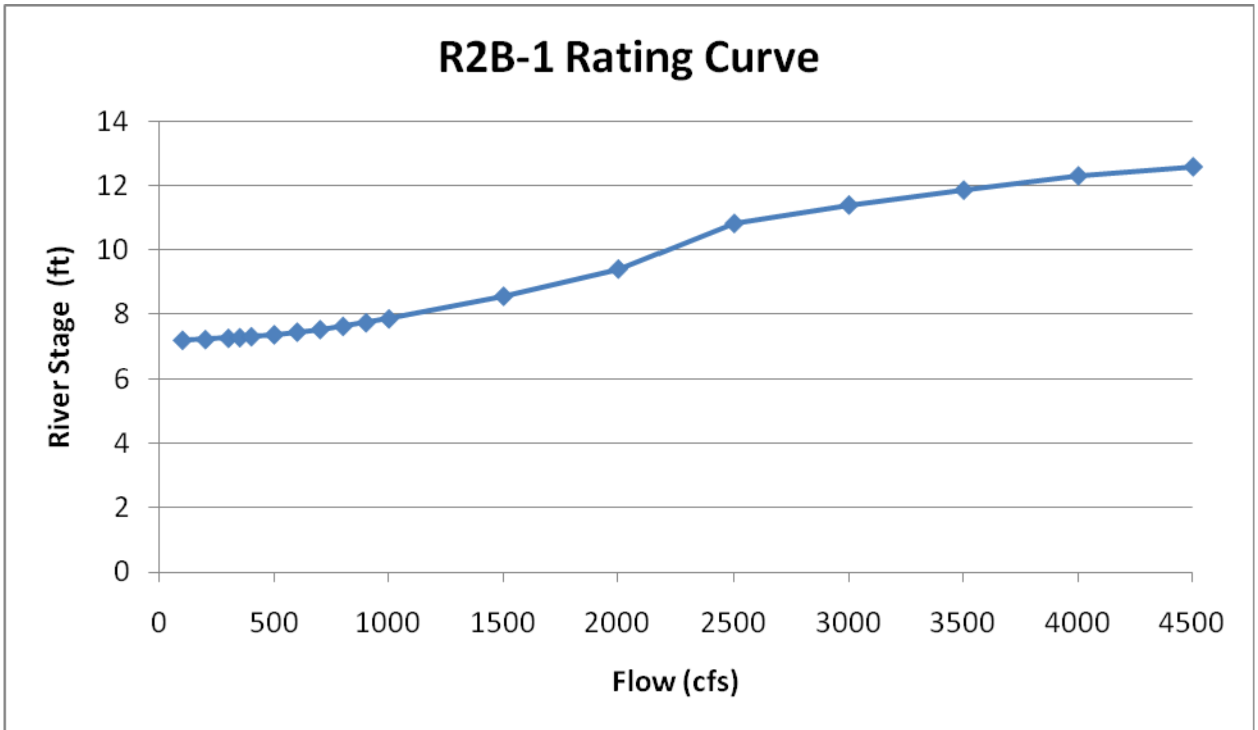

MW-47 Rating Curve
River Stage (ft)
Flow (cfs)
0
2
4
6
8
10
12
14
0 1000 2000 3000 4000 5000 6000 7000 8000

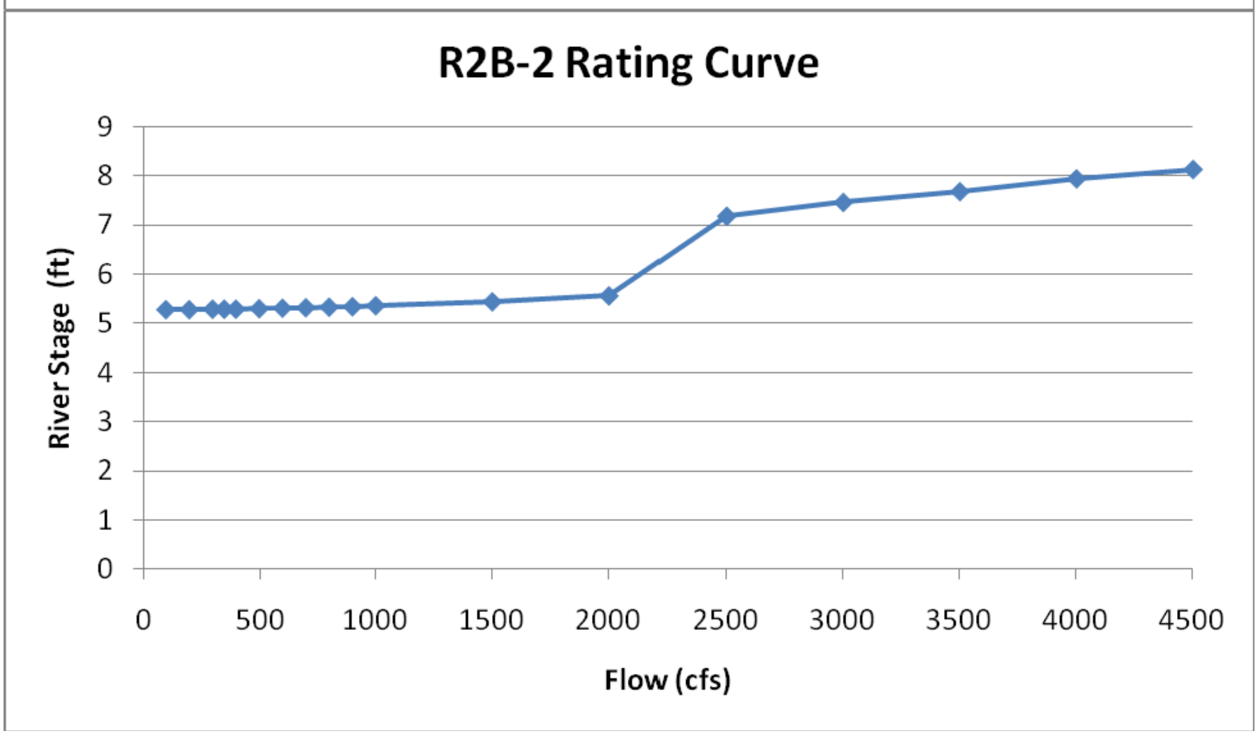

MA-4 Rating Curve
River Stage (ft)
Flow (cfs)
0
2
4
6
8
10
12
14
0
1000
2000
3000
4000
5000
6000
7000
8000

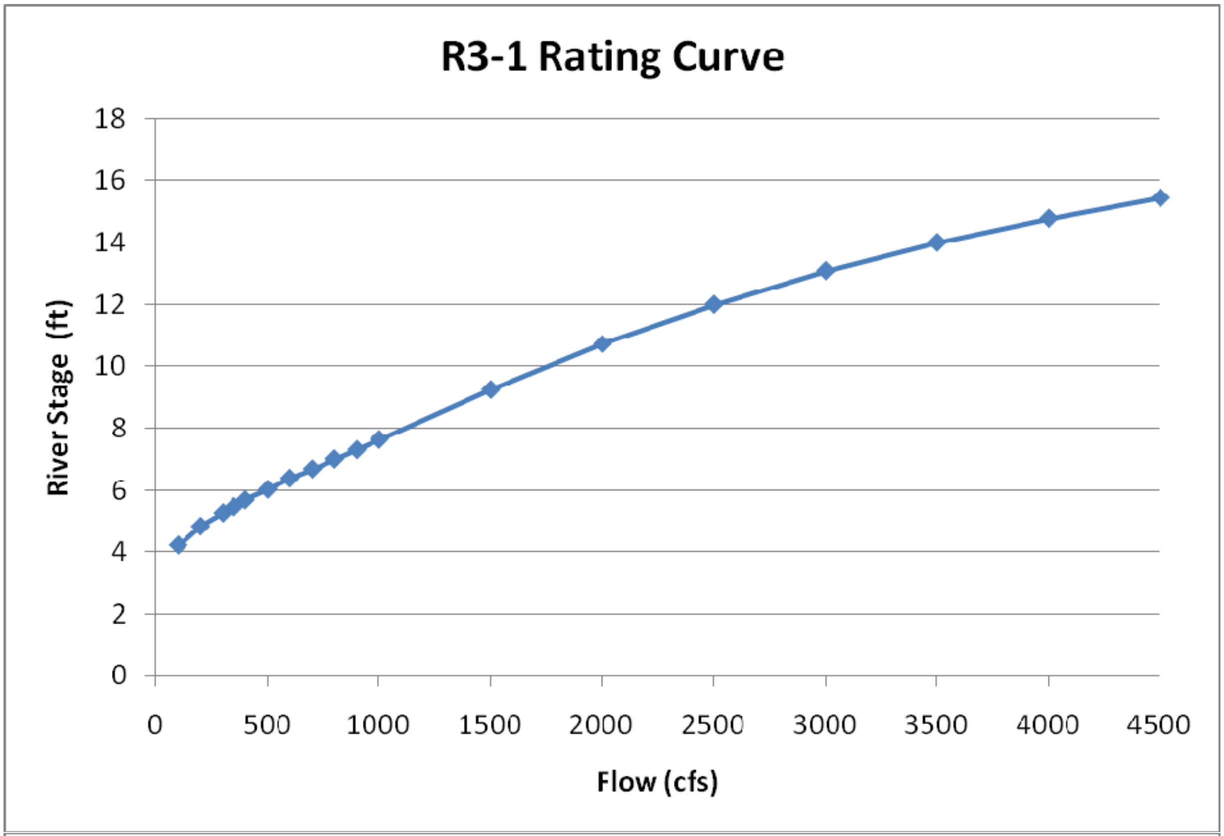

MW-49B Rating Curve
River Stage (ft)
Flow (cfs)
0
2
4
6
8
10
12
14
0
1000
2000
3000
4000
5000
6000
7000
8000

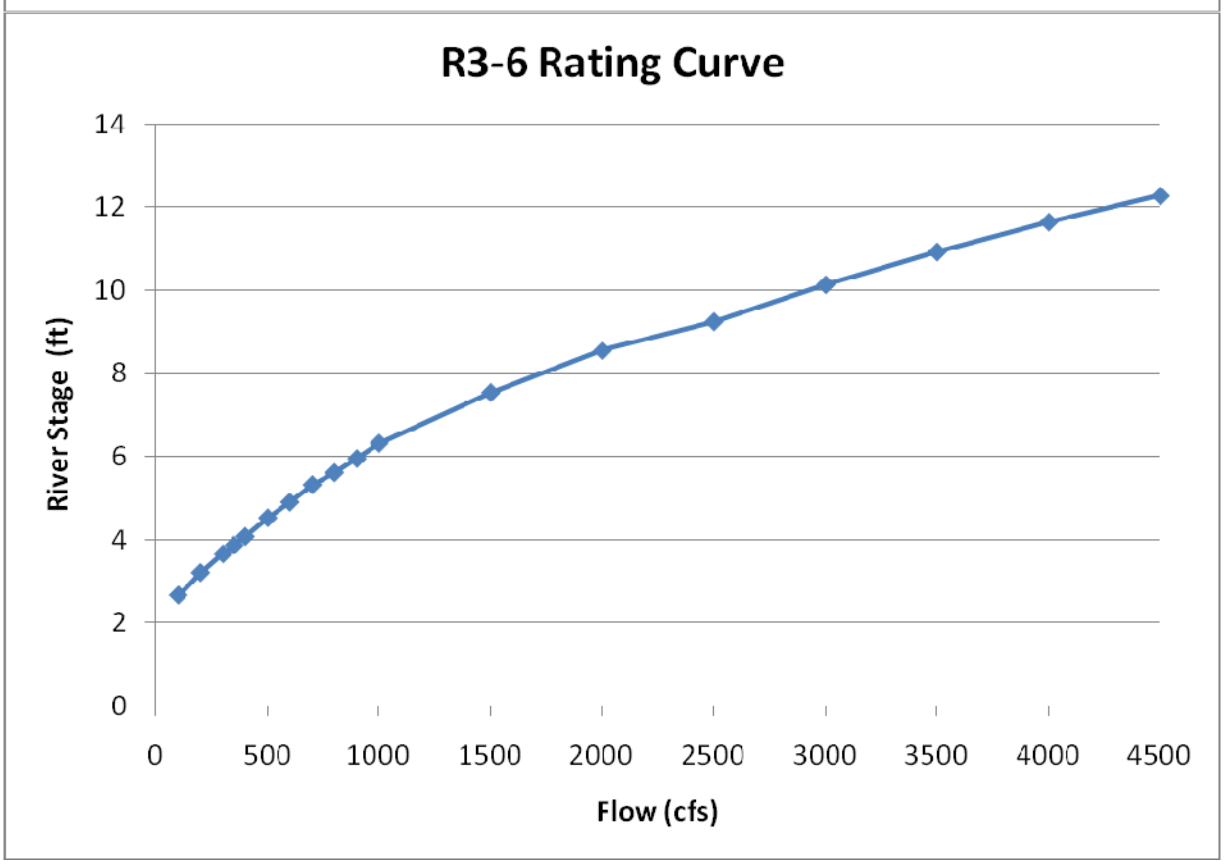

MW-54B Rating Curve
River Stage (ft)
0
2
4
6
8
10
12
14
0
500
1000
1500
2000
2500
3000
3500
4000
4500
Flow (cfs)

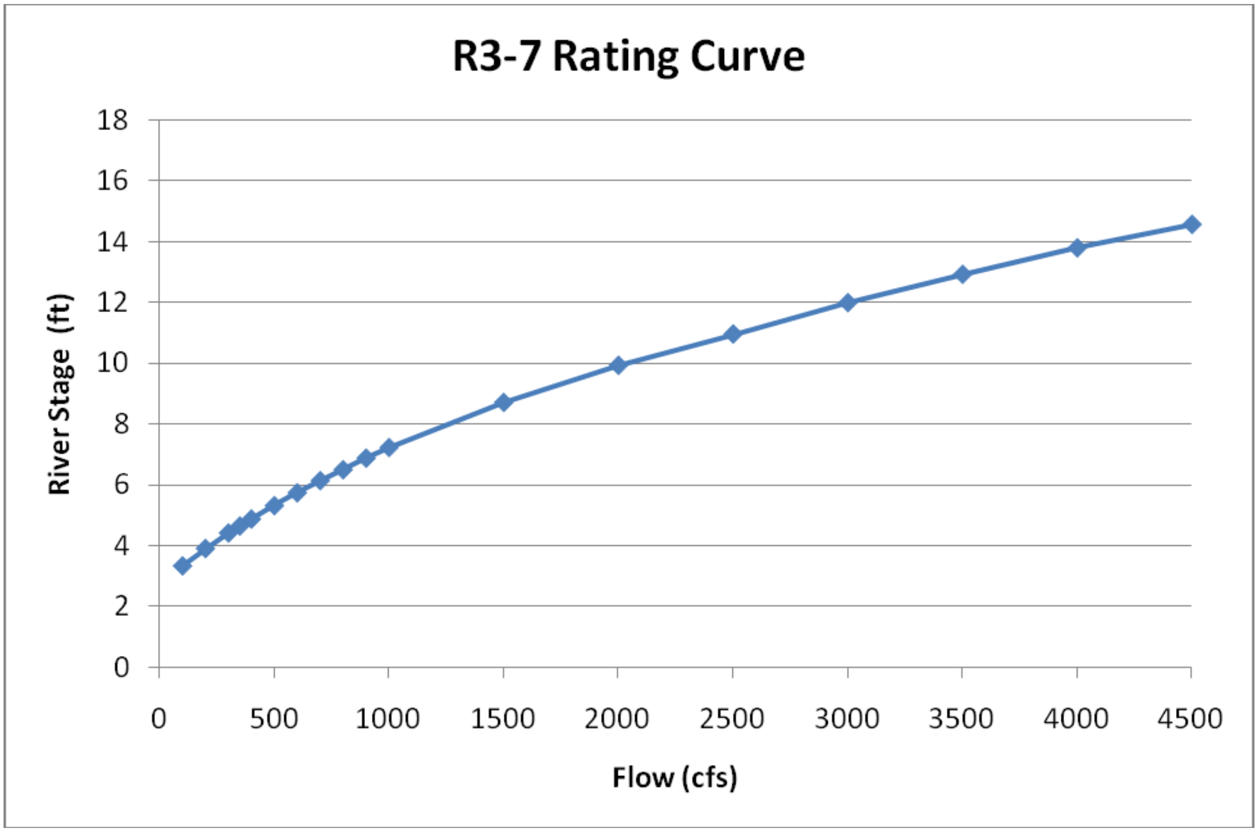

MW-55B Rating Curve
River Stage (ft)
0
2
4
6
8
10
12
14
0
500
1000
1500
2000
2500
3000
3500
4000
4500
Flow (cfs)
MW-55B Rating Curve
San Mateo Manual Measurements
Linear (San Mateo Manual Measurements)

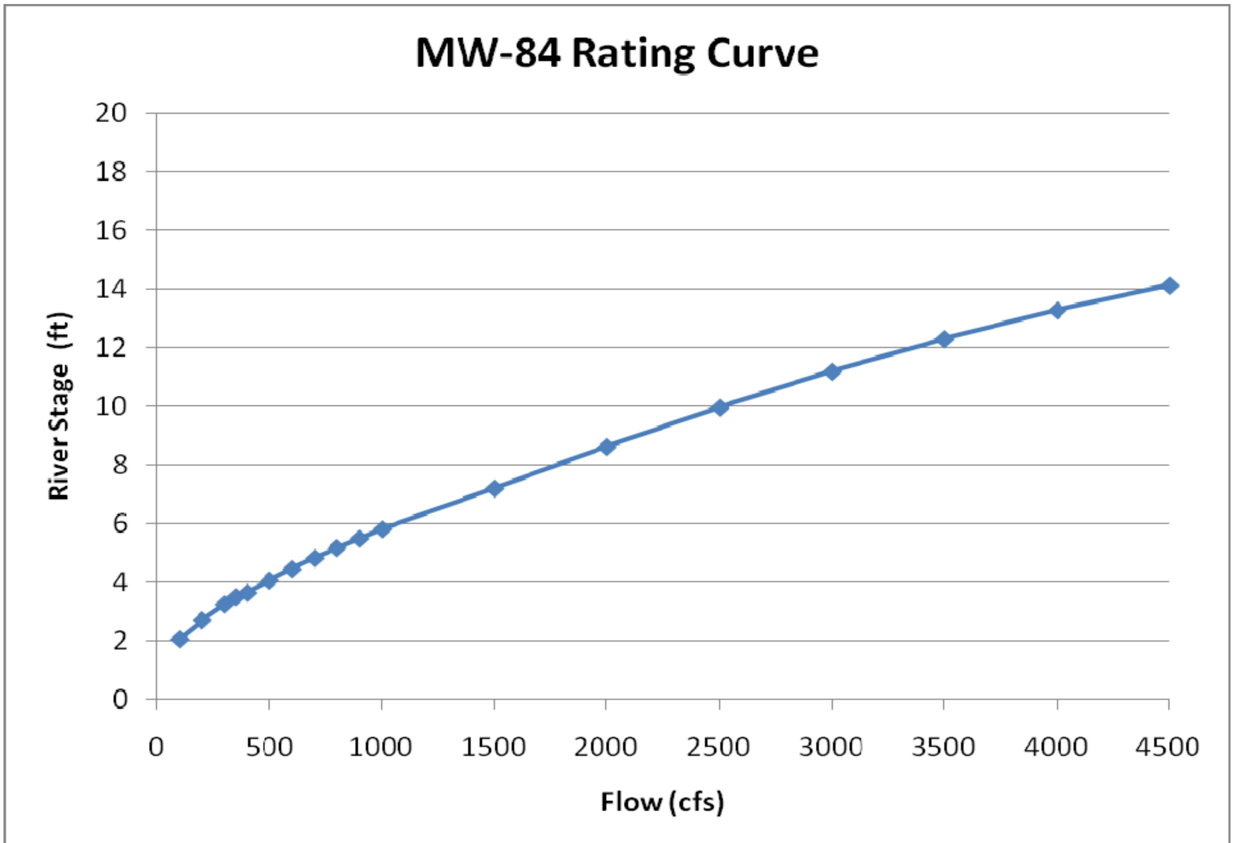

R2B-1 Rating Curve
River Stage (ft)
14
12
10
8
6
4
2
0
0
500
1000
1500
2000
2500
3000
3500
4000
4500
Flow (cfs)


R2B-2 Rating Curve
River Stage (ft)
9
8
7
6
5
4
3
2
1
0
0
500
1000
1500
2000
2500
3000
3500
4000
4500
Flow (cfs)

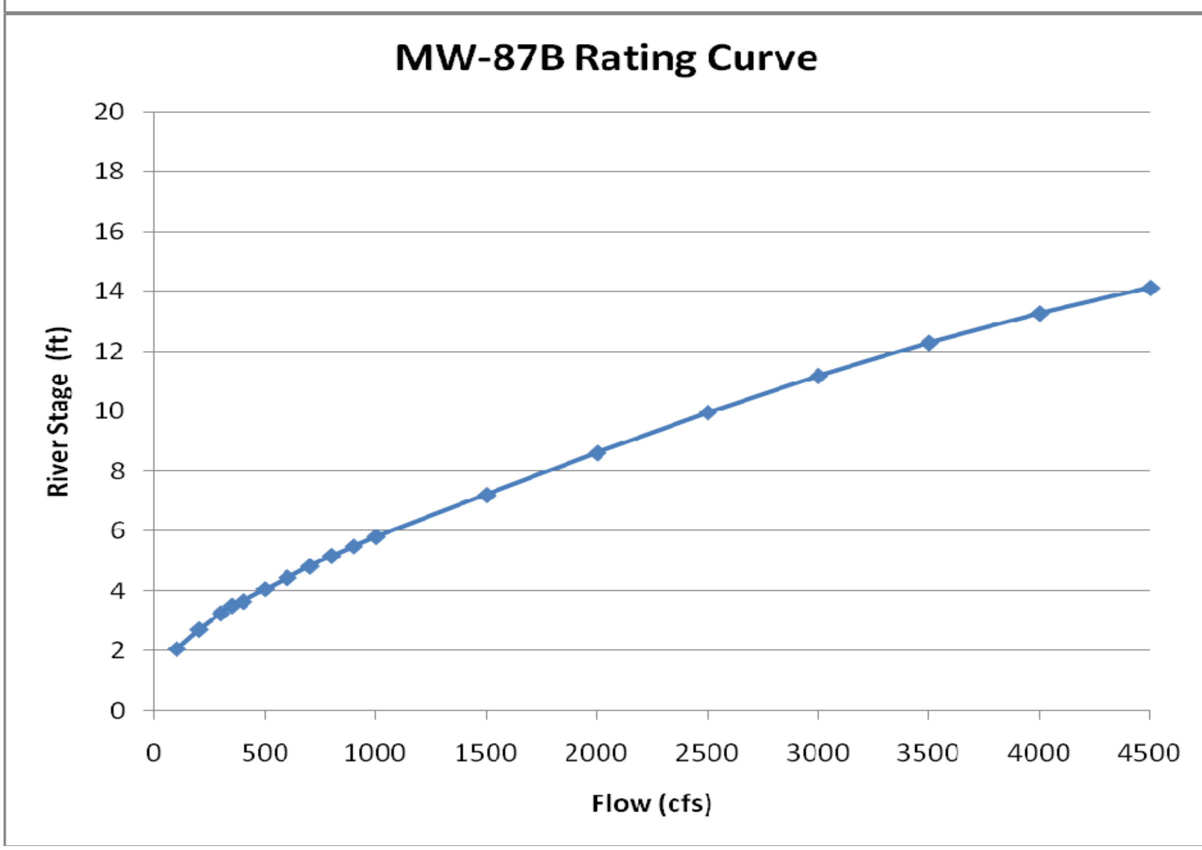

R3-1 Rating Curve
River Stage (ft)
18
16
14
12
10
8
6
4
2
0
0 500 1000 1500 2000 2500 3000 3500 4000 4500
Flow (cfs)


R3-6 Rating Curve
River Stage (ft)
14
12
10
8
6
4
2
0
0 500 1000 1500 2000 2500 3000 3500 4000 4500
Flow (cfs)


R3-7 Rating Curve
River Stage (ft)
18
16
14
12
10
8
6
4
2
0
0
500
1000
1500
2000
2500
3000
3500
4000
4500
Flow (cfs)



MW-84 Rating Curve
River Stage (ft)
Flow (cfs)
0
2
4
6
8
10
12
14
16
18
20
0
500
1000
1500
2000
2500
3000
3500
4000
4500



MW-87B Rating Curve
River Stage (ft)
Flow (cfs)
0
2
4
6
8
10
12
14
16
18
20
0
500
1000
1500
2000
2500
3000
3500
4000
4500

SJRRP Flow Bench Evaluation

April 26, 2010

The April 12th SJRRP flow bench evaluation evaluated an increase to 1600 cfs in Friant Dam releases for the SJRRP. Interim Flows at Friant Dam increased to 1,500 cubic feet per second at noon on Monday, April 12, 2010. Flows were reduced to 1,250 cfs at 4 p.m. on Tuesday, April 13, to manage flows at Gravelly Ford. Flows were increased to 1,350 cfs at 9 a.m. on Saturday, April 17. Flows decreased to 1,100 cfs on Monday, April 19th due to water quality issues in Mendota Pool. On Friday, April 23, flows increased to 1,350 cfs. The evaluation of increasing to 1600 cfs on April 26th is as follows:

1. No change in operation will occur. Friant Dam releases will remain at 1350 cfs with partial recapture at Mendota Pool. Release should be reduced by anticipated Cottonwood and Little Dry Creek inflows so as not to exceed 1300 cfs at the Chowchilla Bifurcation Structure.
2. Sack Dam releases should be maintained at 700 cfs due to potential Reach 4 seepage impacts.
3. Mendota Dam can release water to meet the 700 cfs flow target at Sack Dam and limit releases for the SJRRP such that the combined releases for Interim Flows and Arroyo Canal deliveries do not exceed 1300 cfs.
4. SLDMWA may meet Sack Dam flow targets through the Firebaugh Wasteway to maintain at least 400 cfs of flow in the lower Delta-Mendota Canal. Under conditions when DMC flows fall below 400 cfs, all of the pool demands may be met from SJRRP flows and DMC deliveries to the pool may be zero.
5. Reclamation may request that CCID deliver up to 200 cfs through the Outside Canal from Mendota Pool to Los Banos Creek (Reach 5) if SJRRP inflows exceed the combined demands of Mendota Pool and Sack Dam targets.

Daily evaluations per the water right order will continue throughout the bench.

As of April 26, 2010:

1. Flows rates from provisional real-time data are below known conveyance thresholds (8,000 cfs in Reach 2A, 1,300 cfs in Reach 2B, and 1,300 cfs in Reach 3).
2. Mendota Pool operations calls identified concerns regarding water quality in the DMC and Mendota Pool. This issue was resolved with the use of the Firebaugh Wasteway.
3. The seepage hotline received eight calls, described below. All evaluations determined the planned releases from Friant could proceed but that flows over Sack Dam should be limited, due to seepage concerns within Reach 4, to 700 cfs and Fort Washington Beach in Reach 1 will likely become inundated as described in hotline call #3.
4. Real-time provisional groundwater data does not show groundwater depths crossing identified thresholds.
5. Manually monitored groundwater wells do not show unaddressed groundwater depths crossing identified thresholds. CCID maintained shallow groundwater observation wells show high groundwater depths as reported below.

6. Measured losses in Reach 2A from operations estimates show approximately 200 cfs. Changes in flows below Sack Dam have not stabilized.

7. Projected groundwater levels from the upcoming increase in flow to 1500 cfs are below the top of the buffer zone except for wells R2B-1, MW-49B and MW-55B.

8. The LSJLD was notified of potential increases in flows. The LSJLD provided information on March 29th that flows are adjacent to or inundating 12 flapgates and informed Reclamation that the LSJLD would need to increase monitoring activities in these locations. Merced County's Dan McNamara Road crossing of the Eastside Bypass is unpassable and has been posted, placing public access along the right levee of the Eastside Bypass for County connections.

9. The CCID provided groundwater monitoring information in anticipation of the 1600 cfs flow bench evaluation. A conference call on April 10th between Reclamation and the General Manger reviewed data on 25 wells compared to historical conditions when available. CCID recommended not increasing flows into Reach 4A and performing necessary evaluations to determine if a flow reduction is warranted.

10. The SLCC was notified of potential increases in flows and did not identify any potential issues.

Seepage hotline call #1 was placed on March 4, 2010 regarding Monitoring Well R2B-1. The groundwater level is not predicted to exceed the top of the buffer zone. Figure 1 below plots groundwater level in R2B-1 and Mendota Pool stage.

Seepage hotline call #2 was placed on March 11, 2010 regarding potential seepage in a pomegranate orchard and addressed through the March 16th evaluation. Conditions do not warrant changing the evaluation. Planned releases can occur.

Seepage hotline call #3 was placed on March 15, 2010 regarding future potential flooding at Fort Washington Beach campground and addressed through the March 16th evaluation. 1100 cfs was the owner's estimated maximum flow before flooding. A follow-up call on April 11th described that flows are likely to inundate 9-10 acres of a total of 11 acres of campgrounds that will require a dry-out period prior to returning to a usable state.

Seepage hotline call #4 was emailed on March 26, 2010 regarding groundwater levels in CCID monitoring well 144 in reach 4A with reported levels near the top of the buffer zone. A site evaluation was conducted on March 29. This bench evaluation continues prior release rates in this Reach.

Seepage hotline call #5 was emailed on April 3, 2010 regarding water in seep drains around Jim Nickel's property in Reach 4B. The site was evaluated and found to have water table elevations beneath the field from 4.3 – 8 feet below ground surface. The proposed buffer zone for alfalfa and tomatoes, the applicable crops in this field, is 4-6 feet below ground surface. Evaluation determined that further increases in San Joaquin River flows through Reach 4A may risk seepage impacts. A reduction in flows in this area would likely complicate the data collection efforts of the SJRRP, but would not reduce the risk of impact. Mr. Nickel called the seepage hotline the morning of April 10th to discuss the site, which was recorded as seepage hotline call #6. A follow-up call by Reclamation on the evening of April 10th discussed the evaluation process.

Seepage hotline call #7, emailed on April 19th, 2010 regarding a flooded trail in Lost Lake County Park was evaluated by Fresno County staff and determined to be standing water from the rain. A follow-up check will be conducted in 2 weeks. Planned releases can occur.

Seepage hotline call #8 was discussed with Reclamation staff on April 15, 2010 regarding potential seepage concerns in a future almond orchard. SJRRP staff is conducting a site evaluation and will site monitoring wells. No seepage is reported at this time. Planned releases can occur.

Monitoring Well R2B-1 was measured at 0.85 feet to the top of the buffer zone on April 22, with flows in the river between 1100 and 1350 cfs. Seepage Hotline Call #1 provides an evaluation.

Monitoring Well 49B in Reach 2A measured groundwater depths 0.16 feet above the top of the buffer zone on April 20, with flows in the river between 1100 and 1350 cfs. A site evaluation at this location found a steep groundwater slope away from the river, on the order of a half foot of groundwater elevation decrease for every one hundred feet away from the river. Levels in the monitoring well above the top of the buffer zone will not result in groundwater levels in the fields that are above the top of the buffer zone. There are also protective drains in this area as backup.

Monitoring Well 55B, at San Mateo Road on the left bank, was measured on April 21 at 0.66 feet above the top of the buffer zone, with flows in the river between 1100 and 1350 cfs and recent rainfall. The rating curve for estimating groundwater levels was updated from manual measurements taken at San Mateo Road and predicts a rise to 5 feet below ground surface. A site investigation and evaluation on March 29th identified a groundwater table sloping down, away from the river to depths of 20 feet bgs. Crops consist of young palm trees near the river and pistachios farther inland. Young trees are unlikely to have extensive root systems and pistachios are salt tolerant. Reclamation staff met with the landowner – Baker Farms – on April 9, 2010 to discuss allowing groundwater levels to potentially rise up to 5 feet below ground surface.

Monitoring Well 47, in Reach 2A, shows encroachment into the buffer zone. A site investigation and evaluation is underway. The groundwater level is not predicted to exceed the top of the buffer zone.

Monitoring Well R3-7, in Reach 3, is predicted to go into the buffer zone by 0.1 feet. The groundwater level is not predicted to exceed the top of the buffer zone.

Data

The weekly groundwater report with manual measurements via electronic well sounder and recent flow data is available at: http://restoresjr.net/activities/if/index.html.

Table 1 shows the anticipated changes in flows used to predict future groundwater depths based on Exhibit B loss assumptions and a Reach 3 capacity limitation.

Table 1: Anticipated Change in Flows

	Current Target (cfs)	Future Target (cfs)	Change (cfs)
Reach 2A	955	1355	400
Reach 2B	820	1200	380
Reach 3	1120	1300	180
Reach 4A	700	1000	300

Table 2 shows the current and predicted rise in groundwater based on estimated changes in river stage and the conceptual model shown in Figure 2. Subsequent pages show the rating curves for each of the key wells. (Mussetter Engineering, Inc., 2008. *San Joaquin HEC-RAS Model Documentation.* Technical Memorandum prepared for California Dept. of Water Resources, Fresno, California, June 2). Rating curves were updated April 9, 2010 for MW-55B to include a linear trend rating curve developed from Reclamation's manually measured stage-discharge data that better fits historical groundwater level rise. Rating curves for Reach 4A were updated April 23, 2010 to include new wells and updated model run for Reach 4A, 4B, and the Eastside Bypass.

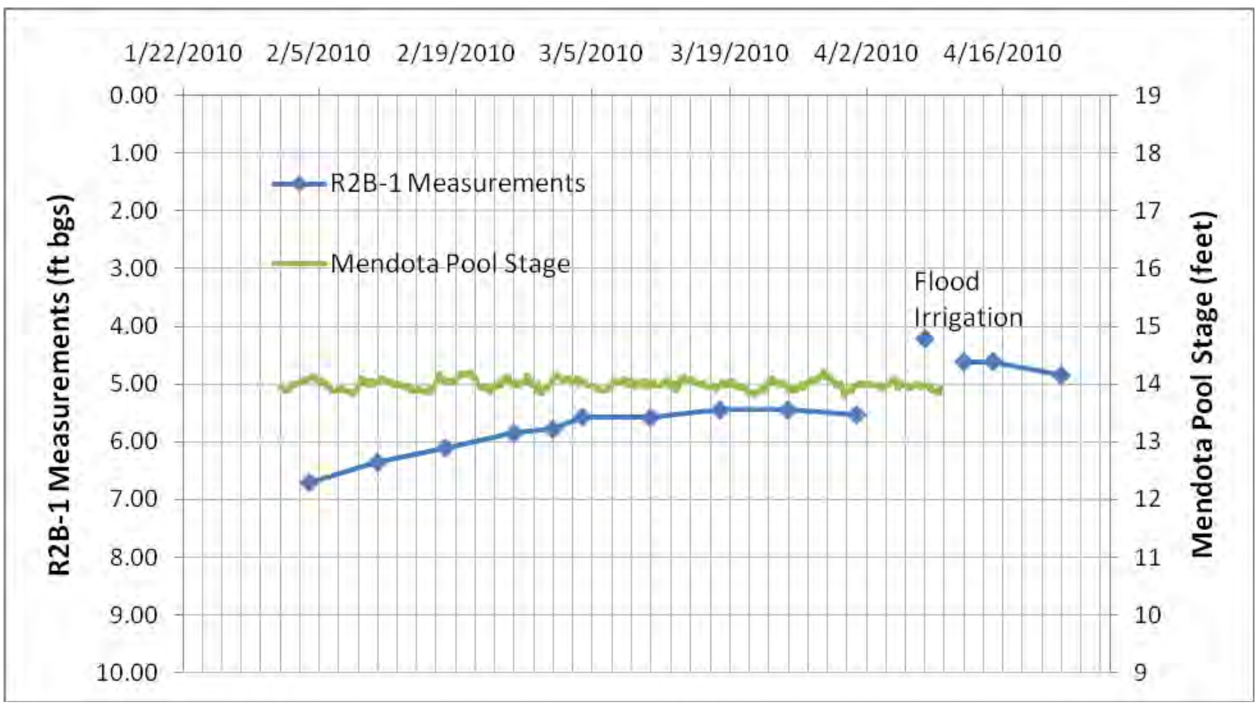


Figure 1 Comparison of Monitoring Well R2B-1 and Mendota Pool Stage

Table 2: Predicted Increases in Groundwater Levels for Key Wells

Well_ID	Site	Buffer Zone (ft bgs)	Screen Depth (ft bgs)	Current Depth Week of April 4th (ft bgs)[1]	Predicted Stage Increase (ft)	Anticipated Depth (ft)
FA-9	Reach 2A – Transect 12 – Left	4-6	12-32	7.98	0.7045	7.3
MW-47	**Reach 2A – Transect 12 – Right**	**6-8**	**20-40**	**7.42**	**0.7045**	**6.7**
MA-4	Reach 2A – Transect 13 – Right	6-8	15-25	11	0.8863	10.1
MW-49B	**Reach 2A – Transect 13 – Left**	**4-6**	**10-20**	**4.52**	**0.8863**	**3.6**
MW-54B	Reach 2B – San Mateo Ave. – Right	TBD	TBD	12.53	1.406	11.1
MW-55B	**Reach 2B – San Mateo Ave. – Left**	**6-8**	**10-15**	**6.33**	**1.406**	**4.9**
R2B-1[2]	**Reach 2B – Right**	**4-6**	**8-11**	**4.61[2]**	**0.628**	**3.982**
R2B-2	Reach 2B – Right	4-6	17-20	12.09	0.076	12.0
R3-1	Reach 3 – Right	4-6	9-24	7.83	0.966	6.9
R3-6	Reach 3 – Right	4-6	17-20	7.37	0.732	6.6
R3-7	Reach 3 – Right	3-5	17-20	5.75	0.888	4.9
MW-84	Reach 4A – Highway 152 – Right	4-6	32-52	29.45	0	29.45
MW-87B	Reach 4A – Highway 152 – Left	4-6	TBD	Dry (>14)	0	Dry

[1] Wells in Reaches 2A were measured on Tuesday, April 6th; MW-54B and MW-56B were measured on Wednesday, April 7th; R2B-1, R2B-2, and wells in Reaches 3 and 4A were measured on Thursday, April 8th. This week of measurements are used because flow was steady at 1100 cfs release from Friant. Later measurements were during unsteady flow periods.

[2] Calculations used the measurement from the week of April 17th. April 10th readings measured depth below ground surface of 4.22 feet due to flood irrigation. Observations the morning of April 12th found depths of 4.62 feet with some standing water in the flood irrigation ditch.

Table 3: Predicted Increases in Groundwater Levels for Reach 4A Wells

Well_ID	Site	Buffer Zone (ft bgs)	Current Depth Week of April 24th (ft bgs)[1]	Predicted Stage Increase (ft)	Anticipated Depth (ft)
MW-84	Reach 4A – Highway 152 – Right	4-6	27.76	.99	26.77
MW-87B	Reach 4A – Highway 152 – Left	4-6	Dry (>14)	.99	Dry to 13.01
CCID 191	S. of San Juan Ranch	4-6	7.6	0.77	6.83
Nickel #1	Hand Auger on San Juan Ranch	4-6	7.08	0.65	6.43
Nickel #2	Hand Auger on San Juan Ranch	4-6	5.39	0.62	4.77
MW-91	San Juan Ranch	4-6	4.36	0.55	3.81
MW-92	San Juan Ranch	4-6	6.14	0.55	5.59
MW-93	San Juan Ranch	4-6	6.76	0.55	6.21
ESB	ESB near Sand Slough	4-6	3.2	0.44	2.76

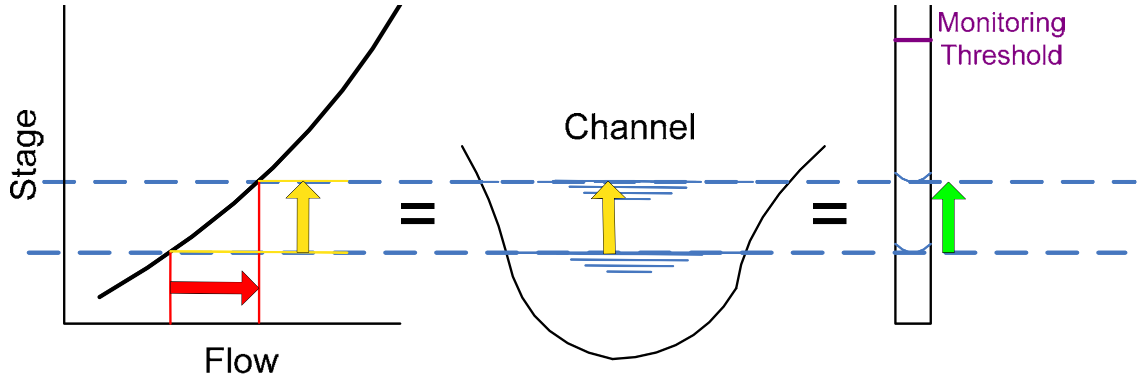
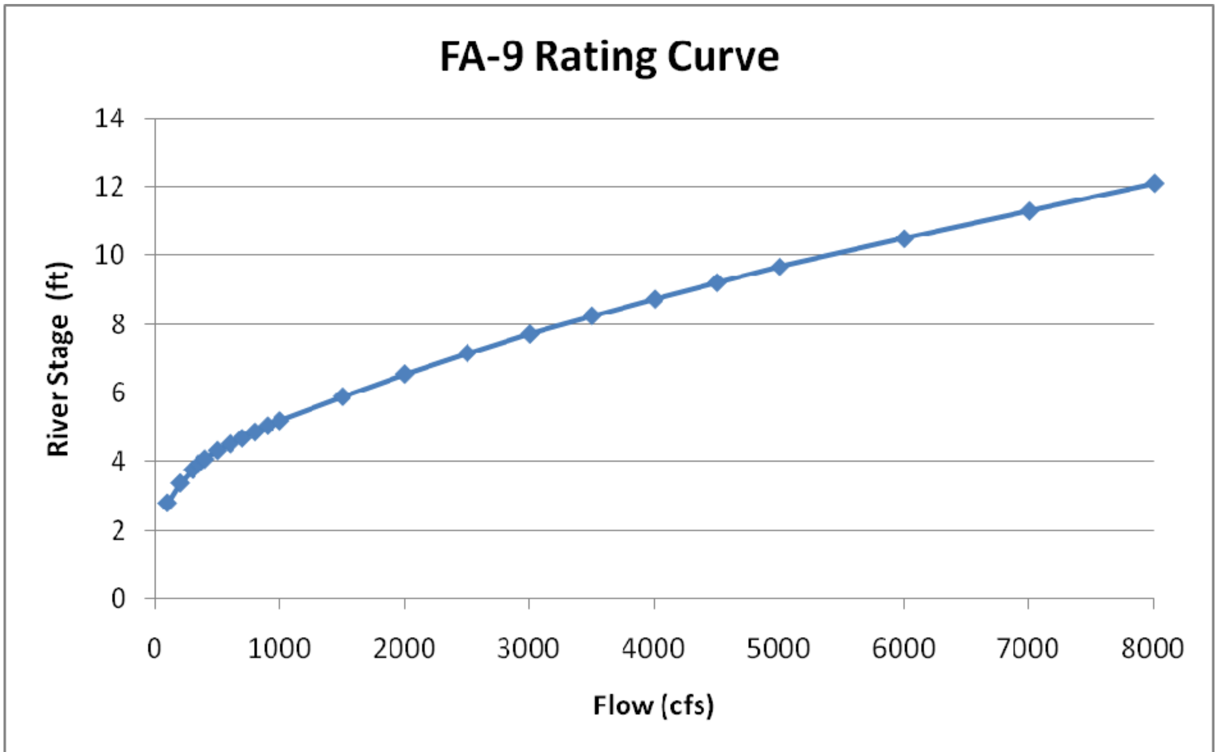
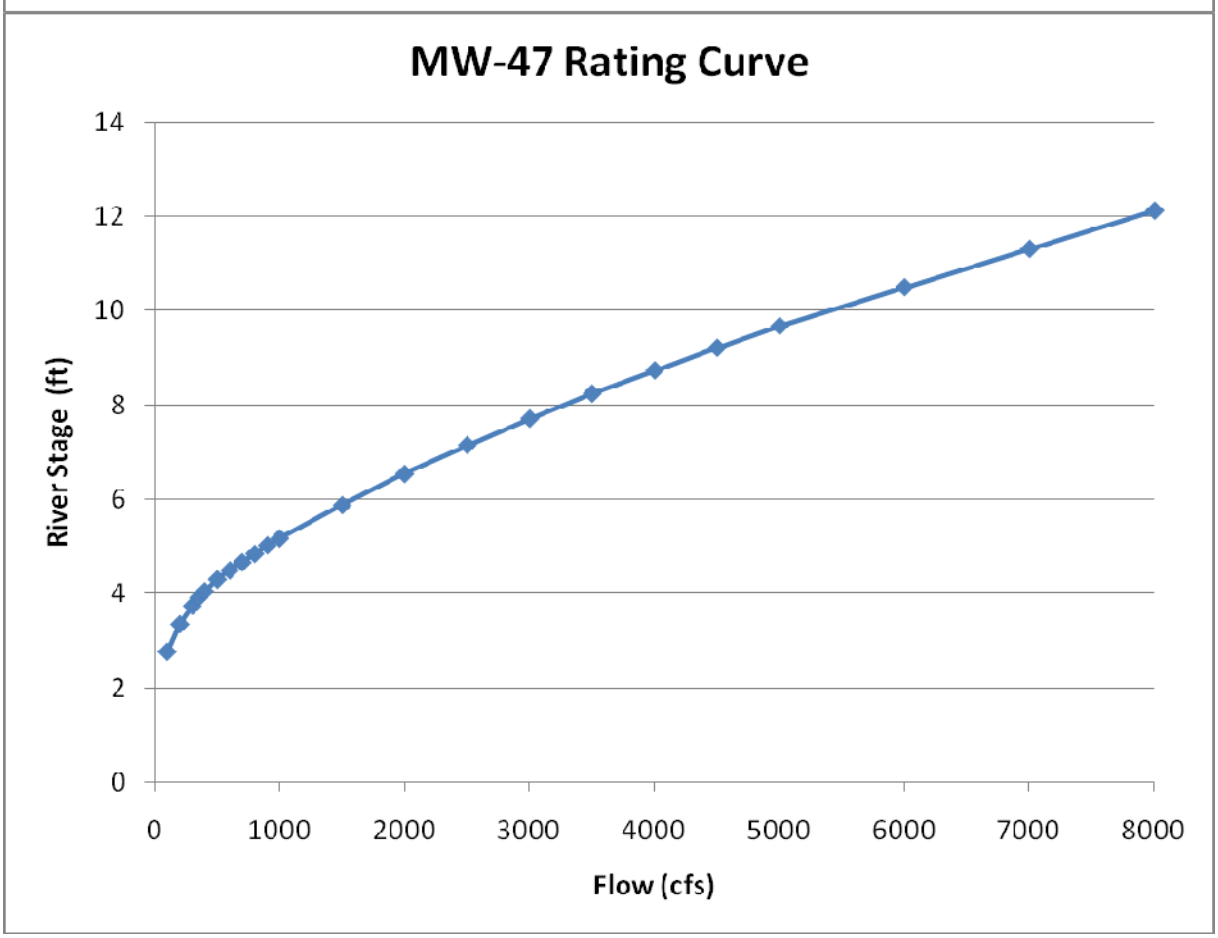
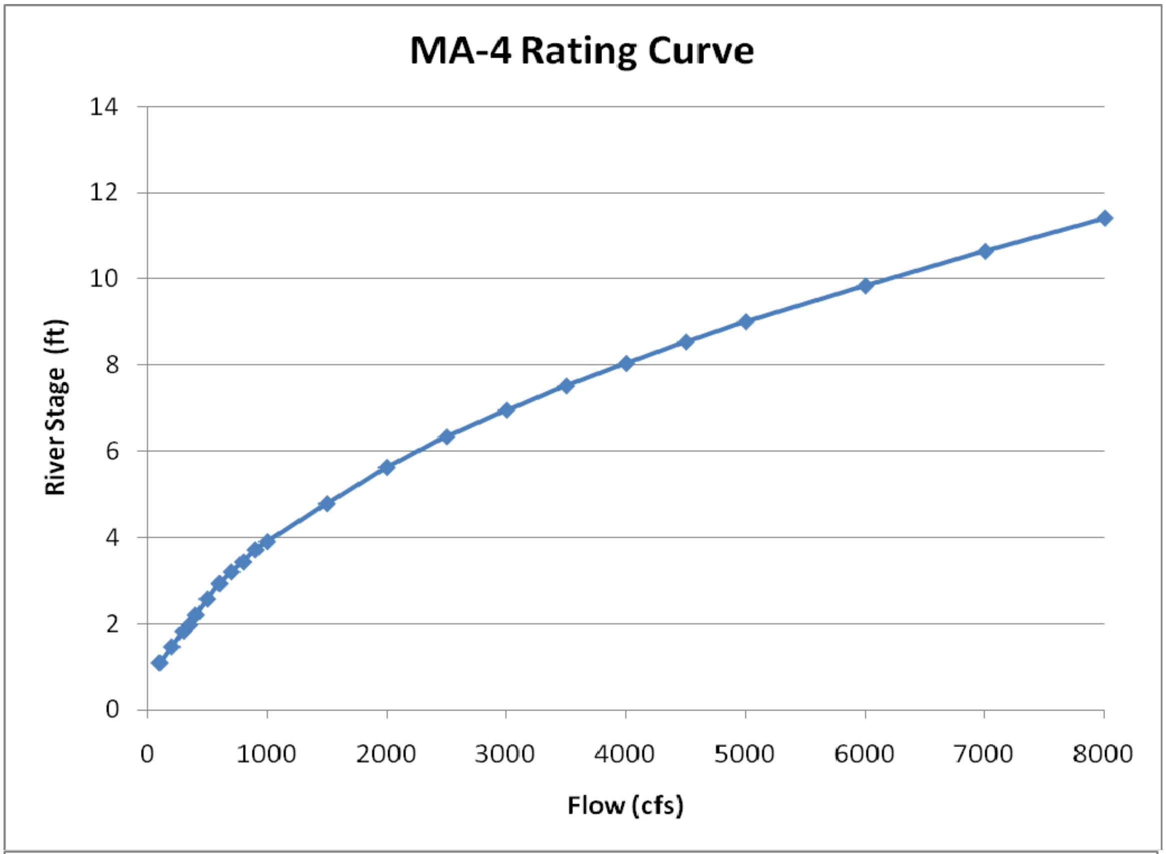
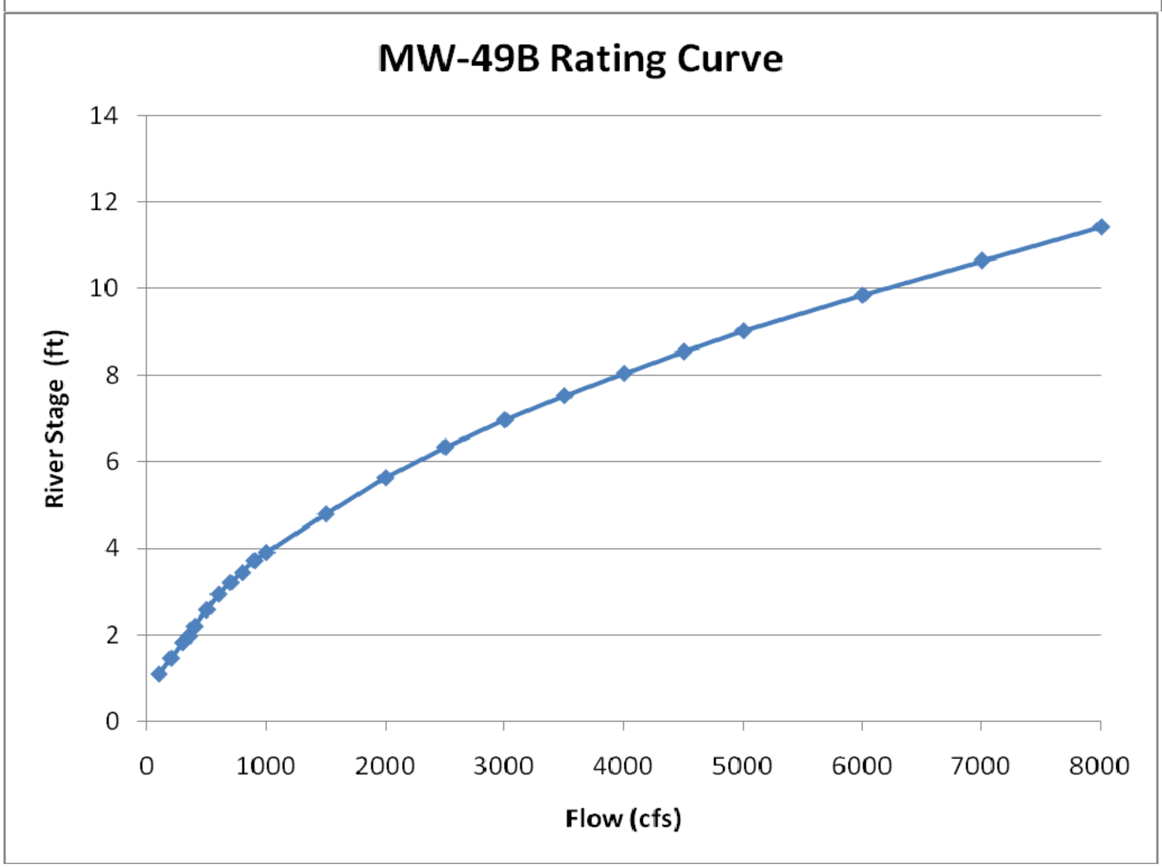


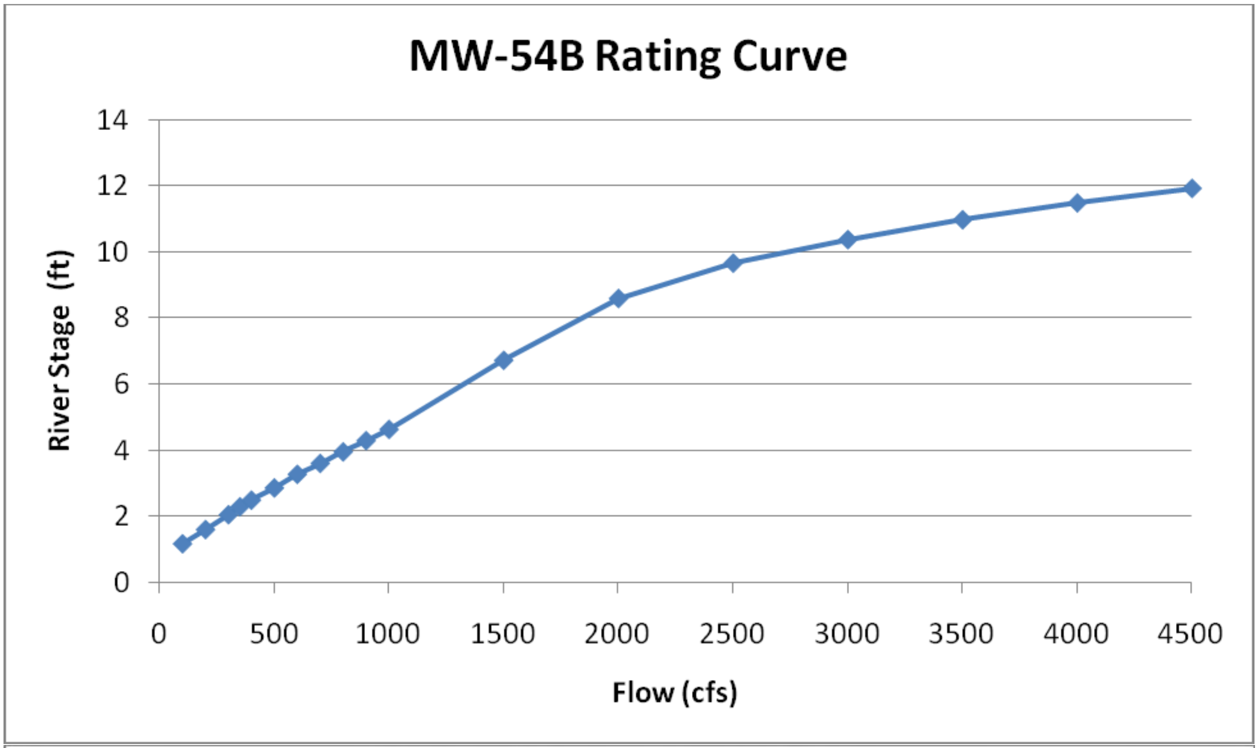
Figure 2: Conceptual Model for Flow Bench Evaluations Estimated Groundwater Depths

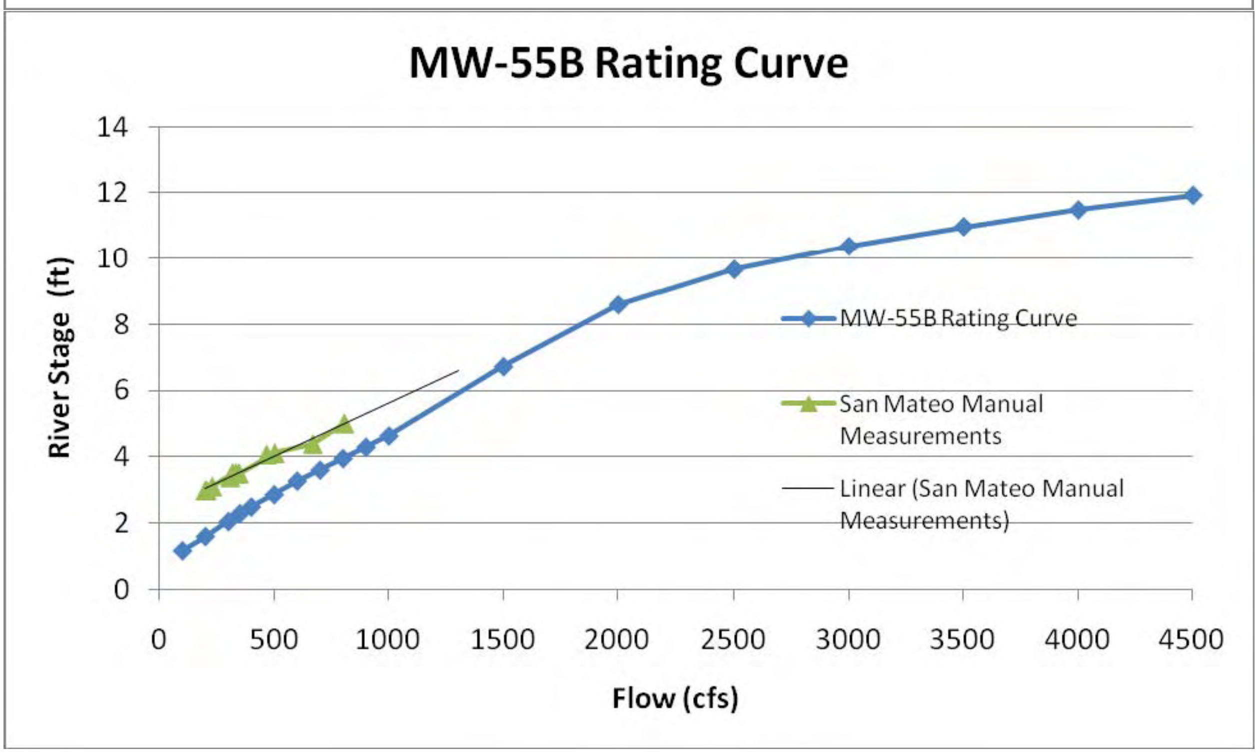

FA-9 Rating Curve
River Stage (ft)
14
12
10
8
6
4
2
0
0
1000
2000
3000
4000
5000
6000
7000
8000
Flow (cfs)

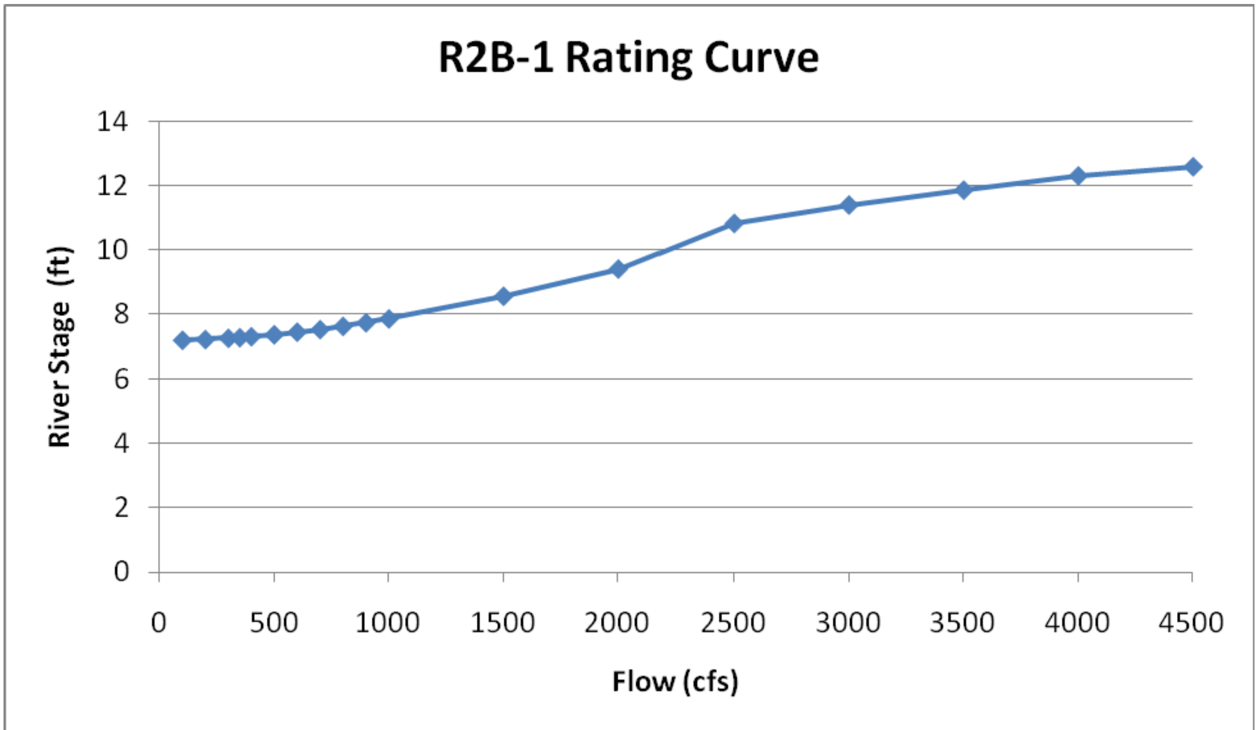

MW-47 Rating Curve
River Stage (ft)
14
12
10
8
6
4
2
0
0
1000
2000
3000
4000
5000
6000
7000
8000
Flow (cfs)

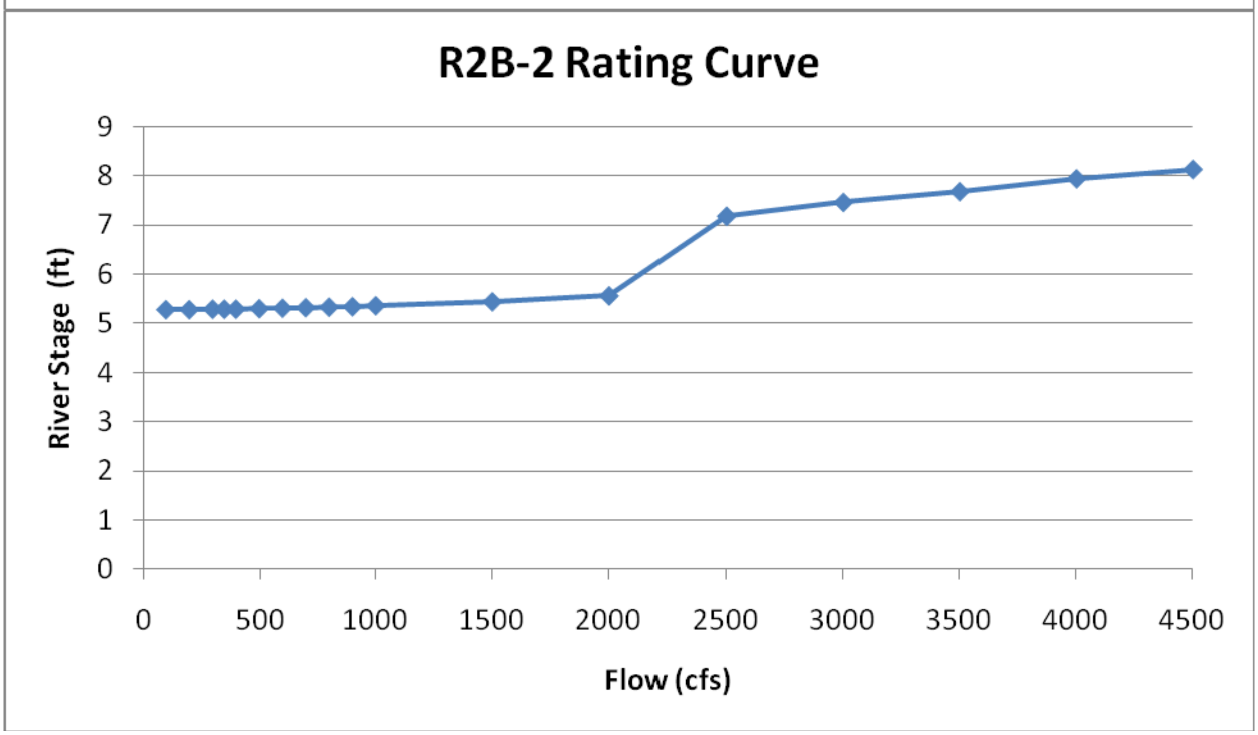

MA-4 Rating Curve
River Stage (ft)
0
2
4
6
8
10
12
14
0
1000
2000
3000
4000
5000
6000
7000
8000
Flow (cfs)

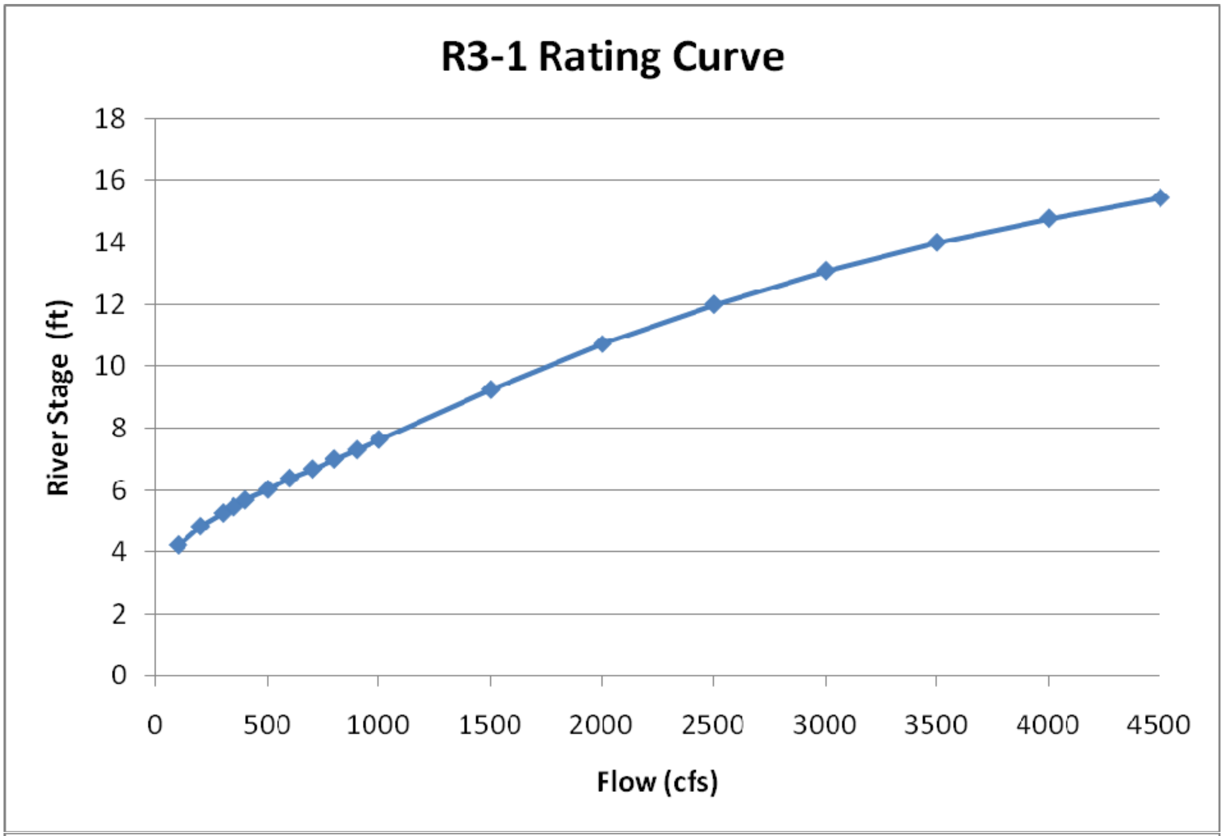

MW-49B Rating Curve
River Stage (ft)
0
2
4
6
8
10
12
14
0
1000
2000
3000
4000
5000
6000
7000
8000
Flow (cfs)

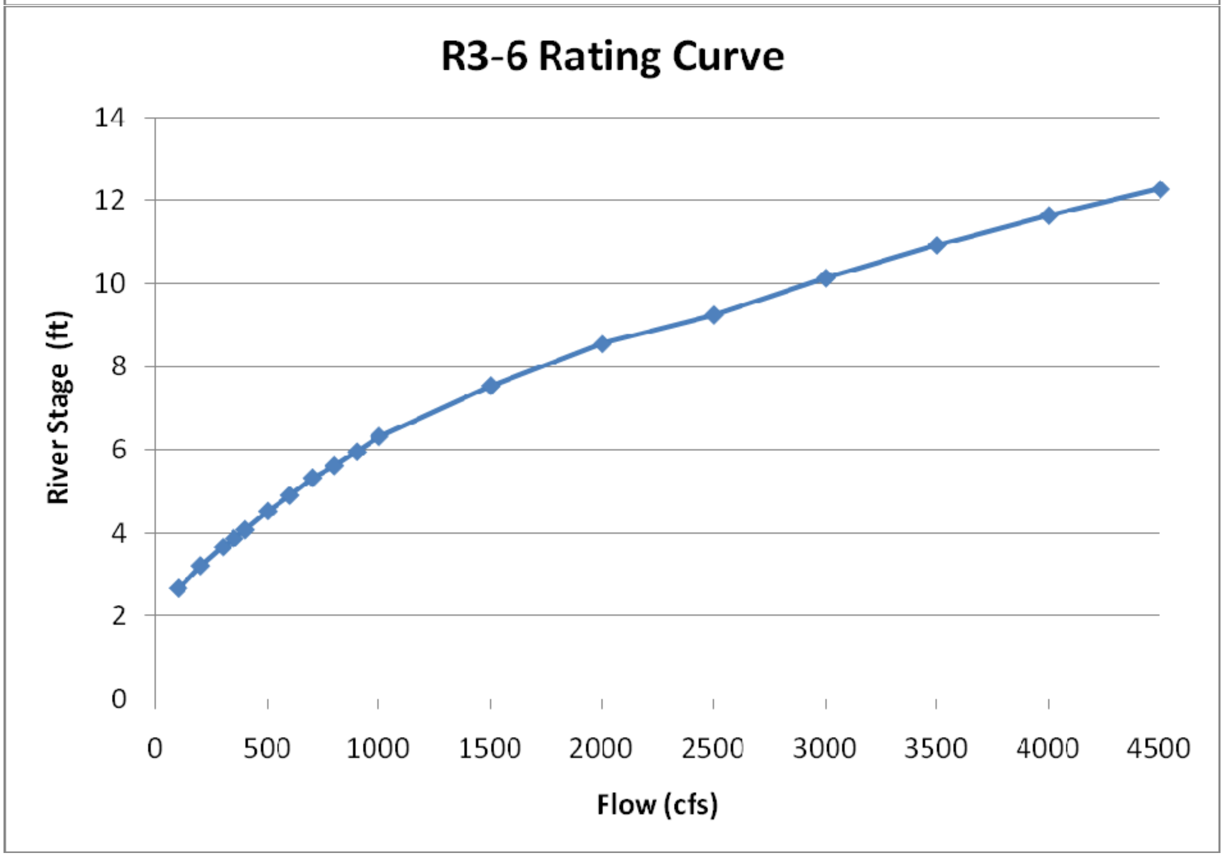

MW-54B Rating Curve
River Stage (ft)
Flow (cfs)
0
2
4
6
8
10
12
14
0
500
1000
1500
2000
2500
3000
3500
4000
4500

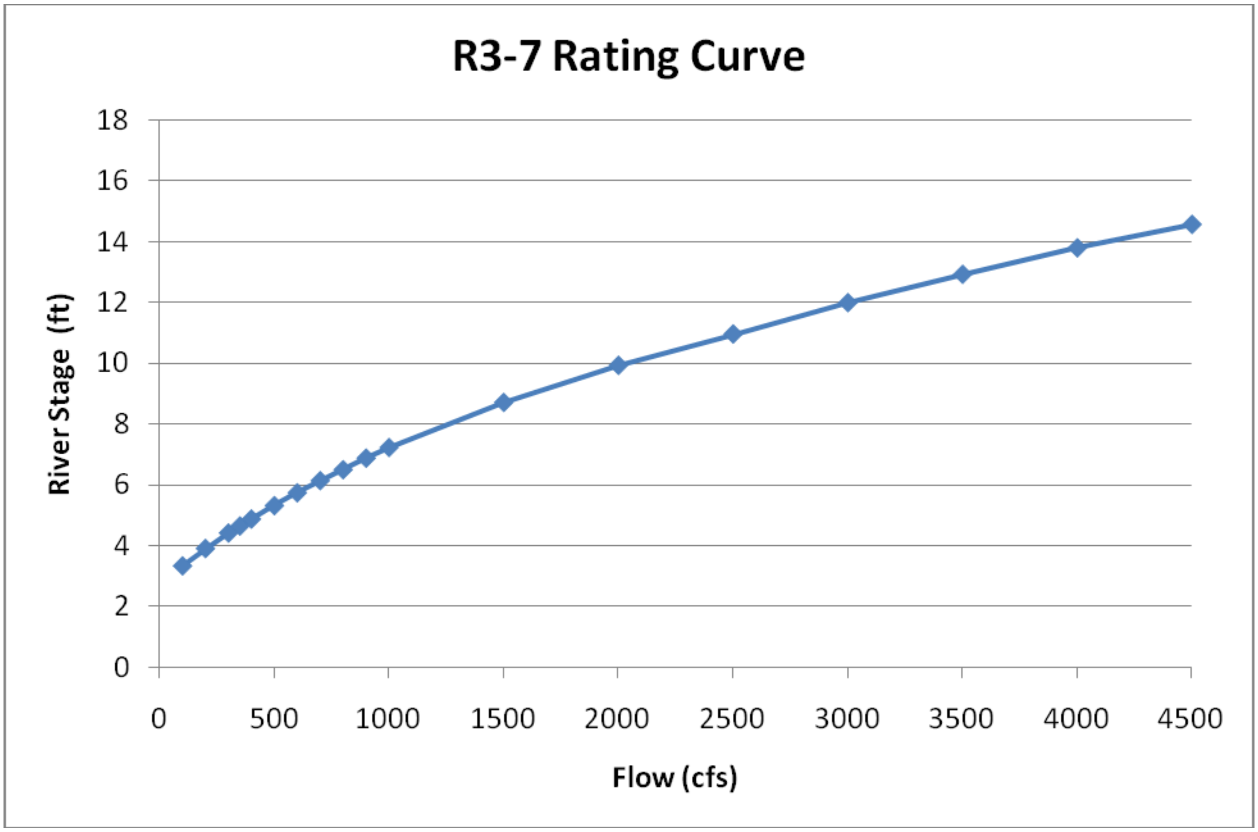

MW-55B Rating Curve
River Stage (ft)
Flow (cfs)
MW-55B Rating Curve
San Mateo Manual Measurements
Linear (San Mateo Manual Measurements)
0
2
4
6
8
10
12
14
0
500
1000
1500
2000
2500
3000
3500
4000
4500

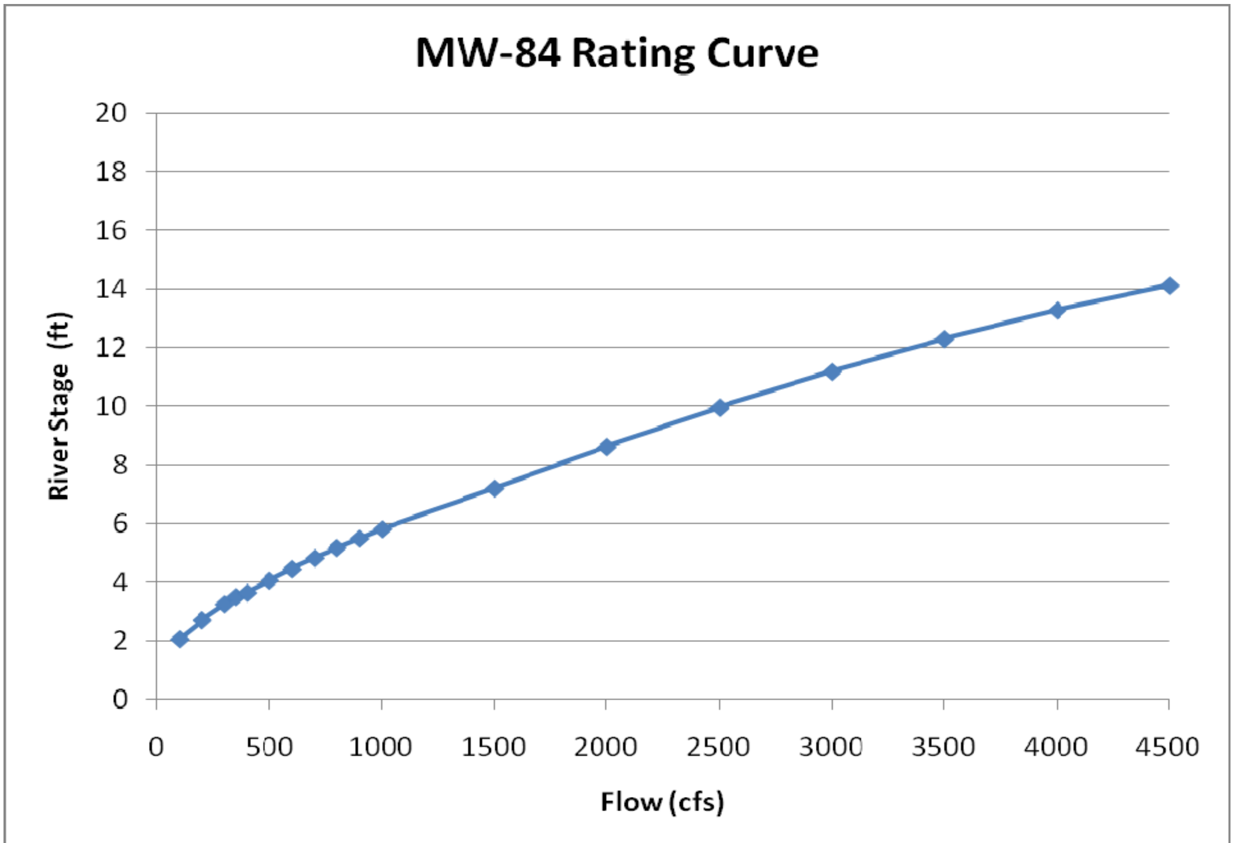

R2B-1 Rating Curve
River Stage (ft)
Flow (cfs)
0
2
4
6
8
10
12
14
0
500
1000
1500
2000
2500
3000
3500
4000
4500

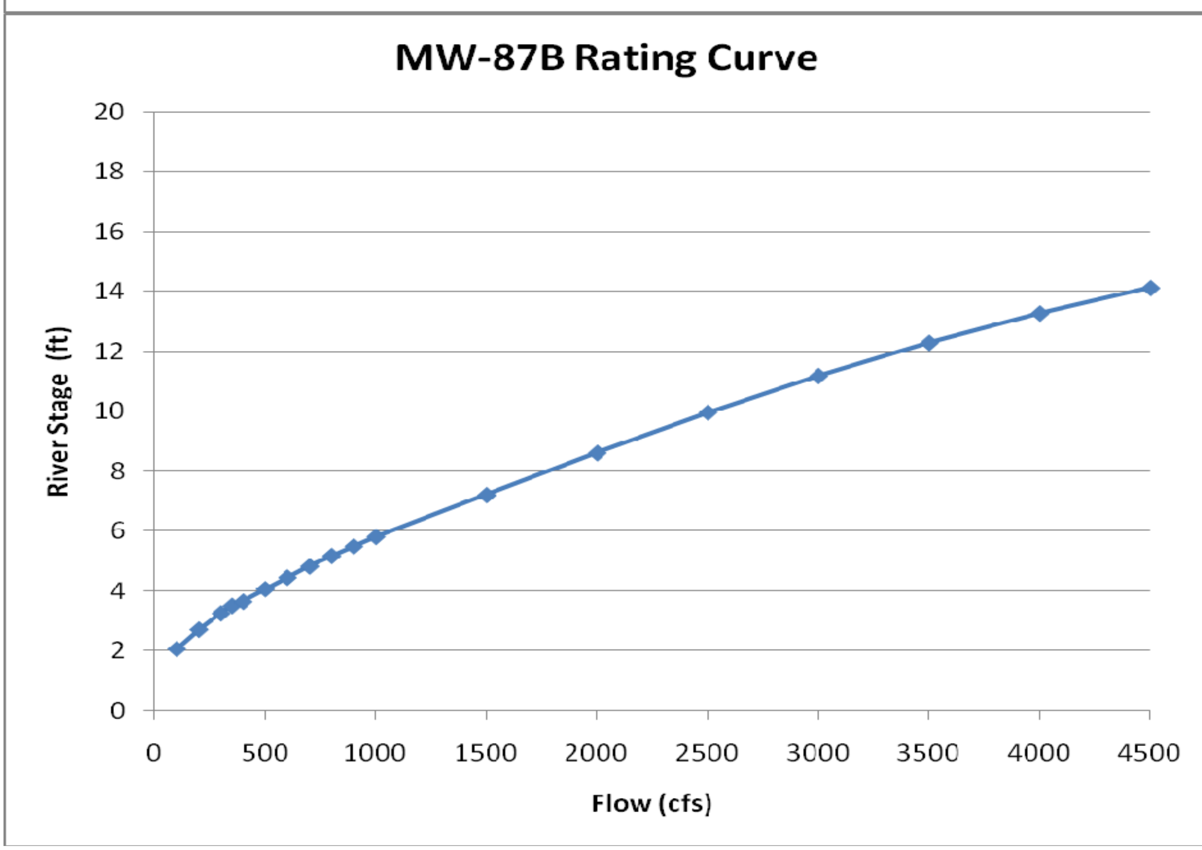

R2B-2 Rating Curve
River Stage (ft)
Flow (cfs)
0
1
2
3
4
5
6
7
8
9
0
500
1000
1500
2000
2500
3000
3500
4000
4500


R3-1 Rating Curve
River Stage (ft)
Flow (cfs)
0
2
4
6
8
10
12
14
16
18
0
500
1000
1500
2000
2500
3000
3500
4000
4500


R3-6 Rating Curve
River Stage (ft)
Flow (cfs)
0
2
4
6
8
10
12
14
0
500
1000
1500
2000
2500
3000
3500
4000
4500


R3-7 Rating Curve
River Stage (ft)
Flow (cfs)
0
2
4
6
8
10
12
14
16
18
0
500
1000
1500
2000
2500
3000
3500
4000
4500


MW-84 Rating Curve
River Stage (ft)
Flow (cfs)
0
2
4
6
8
10
12
14
16
18
20
0
500
1000
1500
2000
2500
3000
3500
4000
4500


MW-87B Rating Curve
River Stage (ft)
Flow (cfs)
0
2
4
6
8
10
12
14
16
18
20
0
500
1000
1500
2000
2500
3000
3500
4000
4500

Attachment 7:

SJRRP Daily Operations Coordination Spreadsheet

SJRRP WY 2010 Daily Operations Coordination

Fall 2009

Date	Type	Friant Dam (cfs)	Gravelly Ford (cfs)	Chowchilla Bypass below Bifurcation (cfs)	SJRRP Below Chowchilla Bifurcation (cfs)	Estimated Gains/Losses (cfs)	SJRRP San Mateo (cfs)	Mendota Pool Demands (cfs)	Pump-In to Mendota Pool (cfs)	King's River to Mendota Pool (cfs)	DMC Inflow to Mendota Pool (cfs)	Firebaugh Wasteway Inflow to Reach 3 (cfs)	SJRRP Demand on Main Canal (cfs)	SLCC at Arroyo Canal (cfs)	CCID Release for SLCC (cfs)	SLDMWA Wasteway Release for SLCC (cfs)	SLDMWA Wasteway Release for SJRRP (cfs)
10/1/2009	Final	215	0	0	0	0	0			0		0	0			0	0
10/2/2009	Final	352	0	0	0	0	0			0		0	0			0	0
10/3/2009	Final	352	0	0	0	0	0			0		0	0			0	0
10/4/2009	Final	352	0	0	0	0	0			0		0	0			0	0
10/5/2009	Final	352	57	0	0	0	0			0		0	0			0	0
10/6/2009	Final	349	87	0	0	0	0			0		0	0			0	0
10/7/2009	Final	348	95	0	0	0	0			0		0	0			0	0
10/8/2009	Final	347	104	0	0	0	0			0		0	0			0	0
10/9/2009	Final	350	108	0	0	0	0			0		0	0			0	0
10/10/2009	Final	348	113	0	0	0	0			0		0	0			0	0
10/11/2009	Final	350	116	0	0	0	0			0		0	0			0	0
10/12/2009	Final	350	126	0	0	0	0			0		0	0			0	0
10/13/2009	Final	350	141	0	0	0	0			0		0	0			0	0
10/14/2009	Final	350	171	0	0	0	0			0		0	0			0	0
10/15/2009	Final	350	177	0	0	0	0			0		0	0			0	0
10/16/2009	Final	351	173	0	0	0	0			0		0	0			0	0
10/17/2009	Final	353	167	0	0	0	0			0		0	0			0	0
10/18/2009	Final	349	158	0	0	0	0			0		0	0			0	0
10/19/2009	Final	348	160	0	0	0	0			0		0	0			0	0
10/20/2009	Final	348	160	0	0	0	0			0		0	0			0	0
10/21/2009	Final	350	154	0	0	0	0			0		0	0			0	0
10/22/2009	Final	350	154	0	0	0	0			0		0	0			0	0
10/23/2009	Final	349	154	0	0	0	0			0		0	0			0	0
10/24/2009	Final	348	156	0	0	0	0			0		0	0			0	0
10/25/2009	Final	351	162	0	0	0	0			0		0	0			0	0
10/26/2009	Final	352	169	0	0	0	0			0		0	0			0	0
10/27/2009	Final	352	171	0	0	0	0			0		0	0			0	0
10/28/2009	Final	352	169	0	0	0	0			0		0	0			0	0
10/29/2009	Final	350	158	0	0	0	0			0		0	0			0	0
10/30/2009	Final	350	150	0	0	0	0			0		0	0			0	0
10/31/2009	Final	349	143	0	0	0	0			0		0	0			0	0

SJRRP WY 2010 Daily Operations Coordination

Fall 2009

Date	Type	Channel Capacity (cfs)	SJRRP Available Reach 3 Capacity (cfs)	SJRRP Available Downstream Capacity (cfs)	Loss Factor below San Mateo	Losses from San Mateo to Sack Dam (cfs)	Total Inflow Credit (cfs)	Flow Objective below Sack Dam (cfs)	Sack Dam (cfs)	San Luis Credit (cfs)	Flow objective above Sack Dam (cfs)	Minimum CCID Release (cfs)	CCID Release for SJRRP thru Gates (cfs)	CCID Release for SJRRP over Boards (cfs)	CCID Total Release (cfs)	USGS near Mendota (cfs)	Mendota Pool Closure (-) Losing Pool (+) Gaining Pool (cfs)	Daily Balance at Sack Dam (-) Below Target (+) Above Target (cfs)	Cumulative Balance at Sack Dam (-) Below Target (+) Above Target (cfs)
10/1/2009	Final	1300	1300	700	5.0%	0	0	0	0	0	0	0				267	0	0	0
10/2/2009	Final	1300	1300	700	5.0%	0	0	0	0	0	0	0				252	0	0	0
10/3/2009	Final	1300	1300	700	5.0%	0	0	0	0	0	0	0				243	0	0	0
10/4/2009	Final	1300	1300	700	5.0%	0	0	0	0	0	0	0				237	0	0	0
10/5/2009	Final	1300	1300	700	5.0%	0	0	0	0	0	0	0				236	0	0	0
10/6/2009	Final	1300	1300	700	5.0%	0	0	0	0	0	0	0				235	0	0	0
10/7/2009	Final	1300	1300	700	5.0%	0	0	0	0	0	0	0				234	0	0	0
10/8/2009	Final	1300	1300	700	5.0%	0	0	0	0	0	0	0				233	0	0	0
10/9/2009	Final	1300	1300	700	5.0%	0	0	0	0	0	0	0				231	0	0	0
10/10/2009	Final	1300	1300	700	5.0%	0	0	0	0	0	0	0				231	0	0	0
10/11/2009	Final	1300	1300	700	5.0%	0	0	0	0	0	0	0				233	0	0	0
10/12/2009	Final	1300	1300	700	5.0%	0	0	0	0	0	0	0				235	0	0	0
10/13/2009	Final	1300	1300	700	5.0%	0	0	0	0	0	0	0				218	0	0	0
10/14/2009	Final	1300	1300	700	5.0%	0	0	0	0	0	0	0				194	0	0	0
10/15/2009	Final	1300	1300	700	5.0%	0	0	0	0	0	0	0				187	0	0	0
10/16/2009	Final	1300	1300	700	5.0%	0	0	0	0	0	0	0				185	0	0	0
10/17/2009	Final	1300	1300	700	5.0%	0	0	0	0	0	0	0				184	0	0	0
10/18/2009	Final	1300	1300	700	5.0%	0	0	0	0	0	0	0				183	0	0	0
10/19/2009	Final	1300	1300	700	5.0%	0	0	0	0	0	0	0				183	0	0	0
10/20/2009	Final	1300	1300	700	5.0%	0	0	0	0	0	0	0				184	0	0	0
10/21/2009	Final	1300	1300	700	5.0%	0	0	0	0	0	0	0				186	0	0	0
10/22/2009	Final	1300	1300	700	5.0%	0	0	0	0	0	0	0				190	0	0	0
10/23/2009	Final	1300	1300	700	5.0%	0	0	0	0	0	0	0				190	0	0	0
10/24/2009	Final	1300	1300	700	5.0%	0	0	0	0	0	0	0				191	0	0	0
10/25/2009	Final	1300	1300	700	5.0%	0	0	0	0	0	0	0				195	0	0	0
10/26/2009	Final	1300	1300	700	5.0%	0	0	0	0	0	0	0				197	0	0	0
10/27/2009	Final	1300	1300	700	5.0%	0	0	0	0	0	0	0				207	0	0	0
10/28/2009	Final	1300	1300	700	5.0%	0	0	0	0	0	0	0				202	0	0	0
10/29/2009	Final	1300	1300	700	5.0%	0	0	0	0	0	0	0				198	0	0	0
10/30/2009	Final	1300	1300	700	5.0%	0	0	0	0	0	0	0				195	0	0	0
10/31/2009	Final	1300	1300	700	5.0%	0	0	0	0	0	0	0				195	0	0	0

SJRRP WY 2010 Daily Operations Coordination

Fall 2009

Date	Type	Friant Dam (cfs)	Gravelly Ford (cfs)	Chowchilla Bypass below Bifurcation (cfs)	SJRRP Below Chowchilla Bifurcation (cfs)	Estimated Gains/Losses (cfs)	SJRRP San Mateo (cfs)	Mendota Pool Demands (cfs)	Pump-In to Mendota Pool (cfs)	King's River to Mendota Pool (cfs)	DMC Inflow to Mendota Pool (cfs)	Firebaugh Wasteway Inflow to Reach 3 (cfs)	SJRRP Demand on Main Canal (cfs)	SLCC at Arroyo Canal (cfs)	CCID Release for SLCC (cfs)	SLDMWA Wasteway Release for SLCC (cfs)	SLDMWA Wasteway Release for SJRRP (cfs)
11/1/2009	Final	553	143	0	0	0	0			0		0	0			0	0
11/2/2009	Final	701	150	0	0	0	0			0		0	0			0	0
11/3/2009	Final	703	199	0	0	0	0			0		0	0			0	0
11/4/2009	Final	699	262	0	0	0	0			0		0	0			0	0
11/5/2009	Final	695	345	0	0	0	0			0		0	0			0	0
11/6/2009	Final	698	398	0	0	0	0			0		0	0			0	0
11/7/2009	Final	698	425	0	0	0	0			0		0	0			0	0
11/8/2009	Final	693	449	0	0	0	0			0		0	0			0	0
11/9/2009	Final	703	462	0	0	0	0			0		0	0			0	0
11/10/2009	Final	710	466	0	123	123	0			0		0	0			0	0
11/11/2009	Final	499	493	0	185	185	0			0		0	0			0	0
11/12/2009	Final	348	518	0	203	134	69			0		0	0			0	0
11/13/2009	Final	346	442	0	225	100	125.2			0		0	0			0	0
11/14/2009	Final	346	312	0	173	67	105.8			0		0	0			0	0
11/15/2009	Final	351	252	0	114	49	65.3			0		0	0			0	0
11/16/2009	Final	357	224	0	87	47	40			0		0	0			0	0
11/17/2009	Final	354	210	0	67	39	28.1			0		0	0			0	0
11/18/2009	Final	352	208	0	60	40	20.1			0		0	0			0	0
11/19/2009	Final	351	210	0	64	46	18.1			0		0	0			0	0
11/20/2009	Final	346	208	0	56	35	21.4			0		0	0			0	0
11/21/2009	Final	216	219	0	56	35	20.8			0		0	0			0	0
11/22/2009	Final	121	224	0	57	33	23.9			0		0	0			0	0
11/23/2009	Final	120	195	0	57	30	27.4			0		0	0			0	0
11/24/2009	Final	120	116	0	31	13	17.8			0		0	0			0	0
11/25/2009	Final	120	82	0	10	9	0.6			0		0	0			0	0
11/26/2009	Final	120	68	0	0	0	0			0		0	0			0	0
11/27/2009	Final	119	56	0	0	0	0			0		0	0			0	0
11/28/2009	Final	119	35	0	0	0	0			0		0	0			0	0
11/29/2009	Final	119	25	0	0	0	0			0		0	0			0	0
11/30/2009	Final	119	22	0	0	0	0			0		0	0			0	0
SUM (cfs)							584										
SUM (Acre-Feet)							1,157										

SJRRP WY 2010 Daily Operations Coordination

Fall 2009

Date	Type	Channel Capacity (cfs)	SJRRP Available Reach 3 Capacity (cfs)	SJRRP Available Downstream Capacity (cfs)	Loss Factor below San Mateo	Losses from San Mateo to Sack Dam (cfs)	Total Inflow Credit (cfs)	Flow Objective below Sack Dam (cfs)	Sack Dam (cfs)	San Luis Credit (cfs)	Flow objective above Sack Dam (cfs)	Minimum CCID Release (cfs)	CCID Release for SJRRP thru Gates (cfs)	CCID Release for SJRRP over Boards (cfs)	CCID Total Release (cfs)	USGS near Mendota (cfs)	Mendota Pool Closure (-) Losing Pool (+) Gaining Pool (cfs)	Daily Balance at Sack Dam (-) Below Target (+) Above Target (cfs)	Cumulative Balance at Sack Dam (-) Below Target (+) Above Target (cfs)
11/1/2009	Final	1300	1300	700	5.0%	0	0	0	0	0	0	0				198	0	0	0
11/2/2009	Final	1300	1300	700	5.0%	0	0	0	0	0	0	0				201	0	0	0
11/3/2009	Final	1300	1300	700	5.0%	0	0	0	0	0	0	0				199	0	0	0
11/4/2009	Final	1300	1300	700	5.0%	0	0	0	0	0	0	0				198	0	0	0
11/5/2009	Final	1300	1300	700	5.0%	0	0	0	0	0	0	0				196	0	0	0
11/6/2009	Final	1300	1300	700	5.0%	0	0	0	0	0	0	0				197	0	0	0
11/7/2009	Final	1300	1300	700	5.0%	0	0	0	0	0	0	0				199	0	0	0
11/8/2009	Final	1300	1300	700	5.0%	0	0	0	0	0	0	0				191	0	0	0
11/9/2009	Final	1300	1300	700	5.0%	0	0	0	0	0	0	0				194	0	0	0
11/10/2009	Final	1300	1300	700	5.0%	0	0	0	0	0	0	0				205	0	0	0
11/11/2009	Final	1300	1300	700	5.0%	0	0	0	0	0	0	0				222	0	0	0
11/12/2009	Final	1300	1300	700	5.0%	3	66	66	0	0	66	66				233	-66	-66	-66
11/13/2009	Final	1300	1300	700	5.0%	6	119	119	0	0	119	119				247	-119	-119	-185
11/14/2009	Final	1300	1300	700	5.0%	5	101	101	0	0	101	101				284	-101	-101	-286
11/15/2009	Final	1300	1300	700	5.0%	3	62	62	4	0	62	62				297	-58	-58	-344
11/16/2009	Final	1300	1300	700	5.0%	2	38	38	15	0	38	38				313	-23	-23	-367
11/17/2009	Final	1300	1300	700	5.0%	1	27	27	23	0	27	27				311	-4	-4	-371
11/18/2009	Final	1300	1300	700	5.0%	1	19	19	20	0	19	19				304	1	1	-371
11/19/2009	Final	1300	1300	700	5.0%	1	17	17	14	0	17	17				304	-3	-3	-374
11/20/2009	Final	1300	1300	700	5.0%	1	20	20	16	0	20	20				301	-4	-4	-378
11/21/2009	Final	1300	1300	700	5.0%	1	20	20	13	0	20	20				292	-7	-7	-385
11/22/2009	Final	1300	1300	700	5.0%	1	23	23	13	0	23	23				277	-10	-10	-395
11/23/2009	Final	1300	1300	700	5.0%	1	26	26	9	0	26	26				265	-18	-18	-413
11/24/2009	Final	1300	1300	700	5.0%	1	17	16.8	2	0	16.8	17				254	-14	-14	-427
11/25/2009	Final	1300	1300	700	5.0%	0	1	0.6	0	0	0.6	1				292	-1	-1	-428
11/26/2009	Final	1300	1300	700	5.0%	0	0	0	0	0	0	0				732	0	0	-428
11/27/2009	Final	1300	1300	700	5.0%	0	0	0	0	0	0	0				659	0	0	-428
11/28/2009	Final	1300	1300	700	5.0%	0	0	0	0	0	0	0				291	0	0	-428
11/29/2009	Final	1300	1300	700	5.0%	0	0	0	0	0	0	0				149	0	0	-428
11/30/2009	Final	1300	1300	700	5.0%	0	0	0	0	0	0	0				88	0	0	-428
SUM (cfs)						27		557	129	0								-428	
SUM (Acre-Feet)						54		1,104	256	0								-848	

SJRRP WY 2010 Daily Operations Coordination

Spring 2010

Date	Type	Friant Dam (cfs)	Gravelly Ford (cfs)	Chowchilla Bypass below Bifurcation (cfs)	SJRRP Below Chowchilla Bifurcation (cfs)	Estimated Gains/Losses (cfs)	SJRRP San Mateo (cfs)	Mendota Pool Demands (cfs)	Pump-In to Mendota Pool (cfs)	King's River to Mendota Pool (cfs)	DMC Inflow to Mendota Pool (cfs)	Firebaugh Wasteway Inflow to Reach 3 (cfs)	SJRRP Demand on Main Canal (cfs)	SLCC at Arroyo Canal (cfs)	CCID Release for SLCC (cfs)	SLDMWA Wasteway Release for SLCC (cfs)	SLDMWA Wasteway Release for SJRRP (cfs)
3/1/2010	Final	437	425	0	192	96	96	816	36	0	650	0	0	47	97	0	0
3/2/2010	Final	499	415	0	241	117	124	805	40	0	650	0	0	97	132	0	0
3/3/2010	Final	502	415	0	250	42	208	805	46	0	650	0	0	132	132	0	0
3/4/2010	Final	504	449	0	272	30	242	810	46	0	650	0	0	132	132	0	0
3/5/2010	Final	506	522	0	297	32	265	758	46	0	650	0	0	132	132	0	0
3/6/2010	Final	507	644	0	369	31	338	728	46	0	700	0	0	132	122	0	0
3/7/2010	Final	509	608	0	410	30	380	713	46	0	600	0	0	122	122	0	0
3/8/2010	Final	500	554	0	385	28	357	750	46	0	600	0	0	122	122	0	0
3/9/2010	Final	496	514	0	359	30	329	792	46	0	600	0	0	122	147	0	0
3/10/2010	Final	497	490	0	345	30	315	755	46	0	600	0	0	147	147	0	0
3/11/2010	Final	498	479	0	327	30	297	714	46	0	600	0	0	147	147	0	0
3/12/2010	Final	500	496	0	338	30	308	740	46	0	600	0	0	147	138	0	0
3/13/2010	Final	501	510	0	351	30	321	710	46	0	600	0	0	138	138	0	0
3/14/2010	Final	503	500	0	359	30	329	670	46	0	500	0	0	138	138	0	0
3/15/2010	Final	500	503	0	361	30	331	705	76	0	500	0	0	138	188	0	0
3/16/2010	Final	674	500	0	364	30	334	645	76	0	500	0	0	188	217	0	0
3/17/2010	Final	800	479	0	364	30	334	753	112	0	600	0	0	217	227	0	0
3/18/2010	Final	801	503	0	375	30	345	724	112	0	600	0	0	227	208	0	0
3/19/2010	Final	801	595	0	418	30	388	673	140	0	500	0	0	208	160	0	0
3/20/2010	Final	802	685	0	458	30	428	706	140	0	500	0	0	160	140	0	0
3/21/2010	Final	803	694	0	483	30	453	684	140	0	650	0	0	140	140	0	0
3/22/2010	Final	804	707	0	495	30	465	735	140	0	700	0	0	140	140	0	0
3/23/2010	Final	805	712	0	506	30	476	737	140	0	600	0	0	140	140	0	0
3/24/2010	Final	807	703	0	509	30	479	777	140	0	600	0	0	140	140	0	0
3/25/2010	Final	808	689	0	502	30	472	863	140	0	750	0	0	140	175	0	0
3/26/2010	Final	803	685	0	509	30	479	838	140	0	850	0	0	175	175	0	0
3/27/2010	Final	801	685	0	513	30	483	795	140	0	850	0	0	175	185	0	0
3/28/2010	Final	801	689	0	516	30	486	745	140	0	650	0	0	185	155	0	0
3/29/2010	Final	949	689	0	520	30	490	693	140	0	500	0	0	155	175	0	0
3/30/2010	Final	1096	694	0	534	30	504	684	140	0	500	0	0	175	175	0	0
3/31/2010	Final	1096	748	0	556	30	526	649	140	0	650	0	0	175	175	0	0

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Date	Type	Channel Capacity (cfs)	SJRRP Available Reach 3 Capacity (cfs)	SJRRP Available Downstream Capacity (cfs)	Loss Factor below San Mateo	Losses from San Mateo to Sack Dam (cfs)	Total Inflow Credit (cfs)	Flow Objective below Sack Dam (cfs)	Sack Dam (cfs)	San Luis Credit (cfs)	Flow objective above Sack Dam (cfs)	Minimum CCID Release (cfs)	CCID Release for SJRRP thru Gates (cfs)	CCID Release for SJRRP over Boards (cfs)	CCID Total Release (cfs)	USGS near Mendota (cfs)	Mendota Pool Closure (-) Losing Pool (+) Gaining Pool (cfs)	Daily Balance at Sack Dam (-) Below Target (+) Above Target (cfs)	Cumulative Balance at Sack Dam (-) Below Target (+) Above Target (cfs)
3/1/2010	Final	1300	1203	700	5.0%	5	91	91	0	0	138	188	92	44	233	219	39	-91	-91
3/2/2010	Final	1300	1168	700	5.0%	6	118	118	30	0	215	250	147	32	311	303	27	-88	-179
3/3/2010	Final	1300	1168	700	5.0%	10	198	198	90	0	330	330	201	0	333	351	1	-108	-287
3/4/2010	Final	1300	1168	700	5.0%	12	230	230	112	0	362	362	230	0	362	368	-4	-118	-405
3/5/2010	Final	1300	1168	700	5.0%	13	252	252	140	0	384	384	300	0	432	457	-50	-112	-517
3/6/2010	Final	1300	1178	700	5.0%	17	321	321	229	0	453	453	300	0	422	506	-110	-92	-609
3/7/2010	Final	1300	1178	700	5.0%	19	361	361	266	0	483	483	357	0	479	550	-28	-95	-704
3/8/2010	Final	1300	1178	700	5.0%	18	339	339	328	0	461	461	337	30	489	578	93	-11	-715
3/9/2010	Final	1300	1153	700	5.0%	16	313	313	339	0	435	460	285	0	432	549	172	26	-689
3/10/2010	Final	1300	1153	700	5.0%	16	299	299	320	0	446	446	285	0	432	538	130	21	-668
3/11/2010	Final	1300	1153	700	5.0%	15	282	282	312	0	429	429	285	0	432	535	98	30	-638
3/12/2010	Final	1300	1162	700	5.0%	15	293	293	318	0	440	440	285	0	423	533	119	25	-613
3/13/2010	Final	1300	1162	700	5.0%	16	305	305	329	0	443	443	285	0	423	520	88	24	-589
3/14/2010	Final	1300	1162	700	5.0%	16	313	313	323	0	451	451	285	0	423	532	134	10	-579
3/15/2010	Final	1300	1112	700	5.0%	17	314	314	334	0	452	502	285	0	473	558	149	20	-559
3/16/2010	Final	1300	1083	700	5.0%	17	317	317	335	0	505	534	285	0	502	588	87	18	-541
3/17/2010	Final	1300	1073	700	5.0%	17	317	317	313	0	534	544	285	0	512	603	37	-4	-545
3/18/2010	Final	1300	1092	700	5.0%	17	328	328	299	0	555	555	285	0	493	602	-17	-29	-574
3/19/2010	Final	1300	1140	700	5.0%	19	369	369	299	0	577	577	364	0	524	605	-37	-70	-644
3/20/2010	Final	1300	1160	700	5.0%	21	407	407	363	0	567	567	401	0	541	632	22	-44	-688
3/21/2010	Final	1300	1160	700	5.0%	23	430	430	415	0	570	570	428	0	568	650	-121	-15	-703
3/22/2010	Final	1300	1160	700	5.0%	23	442	442	428	0	582	582	436	0	576	672	-119	-14	-717
3/23/2010	Final	1300	1160	700	5.0%	24	452	452	436	0	592	592	447	0	587	708	-19	-16	-733
3/24/2010	Final	1300	1160	700	5.0%	24	455	455	463	0	595	595	447	0	587	708	45	8	-725
3/25/2010	Final	1300	1125	700	5.0%	24	448	448	465	0	588	623	442	0	617	729	-10	17	-708
3/26/2010	Final	1300	1125	700	5.0%	24	455	455	461	0	630	630	442	0	617	751	-146	6	-702
3/27/2010	Final	1300	1115	700	5.0%	24	459	459	460	0	634	644	442	0	627	776	-194	1	-701
3/28/2010	Final	1300	1145	700	5.0%	24	462	462	479	0	647	647	442	0	597	790	-28	17	-684
3/29/2010	Final	1300	1125	700	5.0%	25	465	465	498	0	620	640	447	0	622	774	86	33	-651
3/30/2010	Final	1300	1125	700	5.0%	25	479	479	500	0	654	654	453	0	628	766	65	21	-630
3/31/2010	Final	1300	1125	700	5.0%	26	500	500	484	0	675	675	472	0	647	773	-157	-16	-646

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Date	Type	Friant Dam (cfs)	Gravelly Ford (cfs)	Chowchilla Bypass below Bifurcation (cfs)	SJRRP Below Chowchilla Bifurcation (cfs)	Estimated Gains/Losses (cfs)	*SJRRP San Mateo (cfs)*	Mendota Pool Demands (cfs)	Pump-In to Mendota Pool (cfs)	King's River to Mendota Pool (cfs)	DMC Inflow to Mendota Pool (cfs)	Firebaugh Wasteway Inflow to Reach 3 (cfs)	SJRRP Demand on Main Canal (cfs)	SLCC at Arroyo Canal (cfs)	CCID Release for SLCC (cfs)	*SLDMWA Wasteway Release for SLCC (cfs)*	*SLDMWA Wasteway Release for SJRRP (cfs)*
4/1/2010	Final	1095	829	0	640	30	***610***	652	136	0	550	0	**0**	175	145	*0*	*0*
4/2/2010	Final	1094	869	0	724	30	***694***	619	136	0	500	0	**0**	145	145	*0*	*0*
4/3/2010	Final	1094	915	0	761	30	***731***	589	136	0	450	0	**0**	145	145	*0*	*0*
4/4/2010	Final	1094	924	0	783	30	***753***	571	136	0	450	0	**0**	145	125	*0*	*0*
4/5/2010	Final	1094	943	0	809	30	***779***	461	136	0	350	0	**0**	125	125	*0*	*0*
4/6/2010	Final	1092	980	0	814	30	***784***	485	76	0	450	0	**0**	125	125	*0*	*0*
4/7/2010	Final	1100	952	0	805	30	***775***	494	76	0	450	0	**0**	125	125	*0*	*0*
4/8/2010	Final	1105	961	0	818	30	***788***	402	76	0	450	0	**0**	125	145	*0*	*0*
4/9/2010	Final	1104	957	0	818	30	***788***	437	76	0	650	0	**0**	145	130	*0*	*0*
4/10/2010	Final	1103	952	0	805	30	***775***	407	76	0	650	0	**0**	130	130	*0*	*0*
4/11/2010	Final	1102	961	0	831	30	***801***	362	76	0	400	0	**0**	130	130	*0*	*0*
4/12/2010	Final	1234	1003	0	871	30	***841***	368	76	0	300	0	**0**	130	135	*0*	*0*
4/13/2010	Final	1390	1056	0	906	30	***876***	325	71	0	300	0	**0**	135	135	*0*	*0*
4/14/2010	Final	1246	1119	0	941	30	***911***	415	71	0	400	0	**0**	135	135	*0*	*0*
4/15/2010	Final	1245	1224	0	995	30	***965***	423	67	0	400	0	**0**	135	120	*0*	*0*
4/16/2010	Final	1243	1148	0	1009	30	***979***	361	67	0	300	0	**0**	120	100	*0*	*0*
4/17/2010	Final	1313	1114	0	977	30	***947***	428	67	0	200	0	**0**	100	100	*0*	*0*
4/18/2010	Final	1354	1114	0	968	30	***938***	428	67	0	200	0	**0**	100	120	*0*	*0*
4/19/2010	Final	1275	1183	0	995	30	***965***	542	41	0	350	0	**0**	120	120	*0*	*0*
4/20/2010	Final	1104	1241	0	1065	30	***1035***	537	40	0	350	0	**0**	120	110	*0*	*0*
4/21/2010	Final	1103	1247	0	1093	30	***1063***	496	40	0	150	0	**0**	110	90	*0*	*0*
4/22/2010	Final	1103	1137	0	1074	30	***1044***	402	40	0	31	90	**0**	90	0	*90*	*0*
4/23/2010	Final	1248	1044	0	990	30	***960***	411	40	0	0	190	**0**	90	0	*90*	*100*
4/24/2010	Final	1352	1035	0	950	30	***920***	410	40	0	8	350	**0**	75	0	*75*	*275*
4/25/2010	Final	1348	1114	0	968	30	***938***	385	40	0	12	400	**0**	75	0	*75*	*325*
4/26/2010	Final	1344	1224	0	1056	30	***1026***	428	44	0	0	225	**0**	75	0	*75*	*150*
4/27/2010	Final	1341	1247	0	1088	30	***1058***	518	44	0	0	225	**0**	115	0	*115*	*110*
4/28/2010	Final	1338	1253	0	1093	30	***1063***	694	87	0	0	395	**0**	145	0	*145*	*250*
4/29/2010	Final	1345	1218	0	1093	30	***1063***	844	87	0	700	0	**0**	175	175	*0*	*0*
4/30/2010	Final	1352	1212	0	1093	30	***1063***	819	60	0	800	0	**0**	175	150	*0*	*0*

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Date	Type	Channel Capacity (cfs)	SJRRP Available Reach 3 Capacity (cfs)	SJRRP Available Downstream Capacity (cfs)	Loss Factor below San Mateo	Losses from San Mateo to Sack Dam (cfs)	Total Inflow Credit (cfs)	Flow Objective below Sack Dam (cfs)	Sack Dam (cfs)	San Luis Credit (cfs)	Flow objective above Sack Dam (cfs)	Minimum CCID Release (cfs)	CCID Release for SJRRP thru Gates (cfs)	CCID Release for SJRRP over Boards (cfs)	CCID Total Release (cfs)	USGS near Mendota (cfs)	Mendota Pool Closure (-) Losing Pool (+) Gaining Pool (cfs)	Daily Balance at Sack Dam (-) Below Target (+) Above Target (cfs)	Cumulative Balance at Sack Dam (-) Below Target (+) Above Target (cfs)
4/1/2010	Final	1300	1155	700	5.0%	31	579	579	518	0	754	754	543	0	688	810	-95	-61	-707
4/2/2010	Final	1300	1155	700	5.0%	35	659	659	584	0	804	804	626	0	771	871	-92	-75	-782
4/3/2010	Final	1300	1155	700	5.0%	37	694	694	668	0	839	839	667	0	812	928	-23	-26	-808
4/4/2010	Final	1300	1175	700	5.0%	38	715	700	720	15	845	845	690	0	815	962	-10	20	-788
4/5/2010	Final	1300	1175	700	5.0%	39	740	700	767	40	825	825	719	0	844	982	2	67	-721
4/6/2010	Final	1300	1175	700	5.0%	39	745	700	798	45	825	825	715	0	840	987	12	98	-623
4/7/2010	Final	1300	1175	700	5.0%	39	736	700	795	36	825	825	715	0	840	986	27	95	-528
4/8/2010	Final	1300	1155	700	5.0%	39	749	700	812	49	825	845	720	0	865	1000	-61	112	-416
4/9/2010	Final	1300	1170	700	5.0%	39	749	700	820	49	845	845	735	0	865	1010	-218	120	-296
4/10/2010	Final	1300	1170	700	5.0%	39	736	700	827	36	830	830	700	0	830	1000	-228	127	-169
4/11/2010	Final	1300	1170	700	5.0%	40	761	700	817	61	830	830	700	0	830	1010	-58	117	-52
4/12/2010	Final	1300	1165	700	5.0%	42	799	700	823	99	830	835	700	0	835	988	16	123	71
4/13/2010	Final	1300	1165	700	5.0%	44	832	700	807	132	835	835	700	0	835	974	-71	107	178
4/14/2010	Final	1300	1165	700	5.0%	46	865	700	782	165	835	835	700	0	835	965	-139	82	260
4/15/2010	Final	1300	1180	700	5.0%	48	917	700	752	217	835	835	700	0	820	966	-209	52	312
4/16/2010	Final	1300	1200	700	5.0%	49	930	700	756	230	820	820	700	0	800	974	-180	56	368
4/17/2010	Final	1300	1200	700	5.0%	47	900	700	762	200	800	800	700	0	800	978	23	62	430
4/18/2010	Final	1300	1180	700	5.0%	47	891	700	761	191	800	820	700	0	820	997	31	61	491
4/19/2010	Final	1300	1180	700	5.0%	48	917	700	759	217	820	820	700	0	820	1020	-7	59	550
4/20/2010	Final	1300	1190	700	5.0%	52	983	700	764	283	820	820	700	0	810	1020	-72	64	614
4/21/2010	Final	1300	1210	700	5.0%	53	1010	700	773	310	810	810	700	0	790	1010	69	73	687
4/22/2010	Final	1300	1210	700	5.0%	52	992	700	773	292	790	700	700	0	700	936	22	73	760
4/23/2010	Final	1300	1210	700	5.0%	48	912	700	757	212	790	600	600	0	600	812	26	57	817
4/24/2010	Final	1300	1225	700	5.0%	46	874	700	732	174	775	425	450	0	450	647	-130	32	849
4/25/2010	Final	1300	1225	700	5.0%	47	891	700	738	191	775	375	450	0	450	557	-220	38	887
4/26/2010	Final	1300	1225	700	5.0%	51	975	700	746	275	775	550	550	0	550	616	-70	46	933
4/27/2010	Final	1300	1185	700	5.0%	53	1005	700	728	305	815	590	590	0	590	684	-28	28	961
4/28/2010	Final	1300	1155	700	5.0%	53	1010	700	740	310	845	450	450	0	450	630	-58	40	1001
4/29/2010	Final	1300	1125	700	5.0%	53	1010	700	715	310	875	875	700	0	875	769	-238	15	1016
4/30/2010	Final	1300	1150	700	5.0%	53	1010	700	720	310	875	875	700	0	850	1000	-331	20	1036

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Date	Type	Friant Dam (cfs)	Gravelly Ford (cfs)	Chowchilla Bypass below Bifurcation (cfs)	SJRRP Below Chowchilla Bifurcation (cfs)	Estimated Gains/Losses (cfs)	SJRRP San Mateo (cfs)	Mendota Pool Demands (cfs)	Pump-In to Mendota Pool (cfs)	King's River to Mendota Pool (cfs)	DMC Inflow to Mendota Pool (cfs)	Firebaugh Wasteway Inflow to Reach 3 (cfs)	SJRRP Demand on Main Canal (cfs)	SLCC at Arroyo Canal (cfs)	CCID Release for SLCC (cfs)	SLDMWA Wasteway Release for SLCC (cfs)	SLDMWA Wasteway Release for SJRRP (cfs)
5/1/2010	Final	1475	1212	0	1098	30	1068	902	60	0	400	0	0	150	160	0	0
5/2/2010	Final	1546	1241	0	1107	30	1077	1022	60	0	700	0	0	160	160	0	0
5/3/2010	Final	1541	1357	0	1146	30	1116	1069	94	0	800	0	0	160	185	0	0
5/4/2010	Final	1536	1462	0	1240	30	1210	1010	94	0	650	0	0	185	205	0	0
5/5/2010	Final	1541	1481	0	1282	30	1252	1222	94	0	800	0	0	205	237	0	0
5/6/2010	Final	1552	1468	0	1271	30	1241	1281	94	0	1000	0	0	237	257	0	0
5/7/2010	Final	1551	1443	0	1255	30	1225	1372	98	0	1000	0	0	257	257	0	0
5/8/2010	Final	1549	1456	0	1255	30	1225	1399	98	0	1000	0	0	257	282	0	0
5/9/2010	Final	1543	1462	0	1260	30	1230	1424	98	0	1000	0	0	282	382	0	0
5/10/2010	Final	1538	1450	0	1250	30	1220	1753	98	0	800	0	0	382	432	0	0
5/11/2010	Final	1542	1437	0	1245	30	1215	1830	98	0	600	0	0	432	472	0	0
5/12/2010	Final	1553	1412	0	1220	30	1190	1913	78	0	900	0	0	472	495	0	0
5/13/2010	Final	1546	1419	0	1215	30	1185	1948	78	0	1000	0	0	495	495	0	0
5/14/2010	Final	1540	1381	0	1200	30	1170	2072	78	0	1100	0	0	495	445	0	0
5/15/2010	Final	1534	1350	0	1171	30	1141	2022	78	0	1100	0	0	445	445	0	0
5/16/2010	Final	1541	1357	0	1156	30	1126	1967	78	0	1025	0	0	445	415	0	0
5/17/2010	Final	1546	1375	0	1171	30	1141	1865	78	0	800	0	0	415	365	0	0
5/18/2010	Final	1539	1344	0	1156	30	1126	1842	78	0	800	0	0	365	325	0	0
5/19/2010	Final	1532	1350	0	1171	30	1141	1928	74	0	1000	0	0	325	355	0	0
5/20/2010	Final	1554	1350	0	1151	30	1121	1901	74	0	1200	0	0	355	365	0	0
5/21/2010	Final	1558	1332	0	1176	30	1146	1751	76	0	1000	0	0	365	320	0	0
5/22/2010	Final	1550	1344	0	1181	30	1151	1794	76	0	1000	0	0	320	295	0	0
5/23/2010	Final	1546	1344	0	1200	30	1170	1807	76	0	800	0	0	295	270	0	0
5/24/2010	Final	1554	1338	0	1205	30	1175	1811	76	0	700	0	0	270	235	0	0
5/25/2010	Final	1558	1319	0	1210	30	1180	1855	71	0	1650	0	0	235	280	0	0
5/26/2010	Final	1550	1319	0	1215	30	1185	1797	71	0	1250	0	0	280	280	0	0
5/27/2010	Final	1541	1319	0	1230	30	1200	1840	60	0	1450	0	0	280	265	0	0
5/28/2010	Final	1121	1319	0	1235	30	1205	1690	60	0	1250	0	0	265	250	0	0
5/29/2010	Final	798	1276	0	1230	30	1200	1640	60	0	1150	0	0	250	245	0	0
5/30/2010	Final	795	993	0	1103	30	1073	1610	60	0	1050	0	0	245	275	0	0
5/31/2010	Final	791	779	0	804	30	774	1540	60	0	1500	0	0	275	250	0	0

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Date	Type	Channel Capacity (cfs)	SJRRP Available Reach 3 Capacity (cfs)	SJRRP Available Downstream Capacity (cfs)	Loss Factor below San Mateo	Losses from San Mateo to Sack Dam (cfs)	Total Inflow Credit (cfs)	Flow Objective below Sack Dam (cfs)	Sack Dam (cfs)	San Luis Credit (cfs)	Flow objective above Sack Dam (cfs)	Minimum CCID Release (cfs)	CCID Release for SJRRP thru Gates (cfs)	CCID Release for SJRRP over Boards (cfs)	CCID Total Release (cfs)	USGS near Mendota (cfs)	Mendota Pool Closure (-) Losing Pool (+) Gaining Pool (cfs)	Daily Balance at Sack Dam (-) Below Target (+) Above Target (cfs)	Cumulative Balance at Sack Dam (-) Below Target (+) Above Target (cfs)
5/1/2010	Final	1300	1140	700	5.0%	53	1015	700	773	315	850	860	700	0	860	1020	200	73	1109
5/2/2010	Final	1300	1140	700	5.0%	54	1023	700	764	323	860	860	700	0	860	977	3	64	1173
5/3/2010	Final	1300	1115	700	5.0%	56	1060	700	734	360	860	885	700	0	885	999	-151	34	1207
5/4/2010	Final	1300	1095	700	5.0%	61	1149	700	741	449	885	905	700	0	905	1040	-142	41	1248
5/5/2010	Final	1300	1063	700	5.0%	63	1189	700	737	489	905	937	700	0	937	1070	-124	37	1285
5/6/2010	Final	1300	1043	700	5.0%	62	1179	700	715	479	937	957	700	0	957	1060	-277	15	1300
5/7/2010	Final	1300	1043	700	5.0%	61	1164	700	665	464	957	957	700	0	957	1060	-225	-35	1265
5/8/2010	Final	1300	1018	700	5.0%	61	1164	700	662	464	957	982	700	0	982	1080	-201	-38	1227
5/9/2010	Final	1300	918	500	5.0%	62	1168	500	654	668	782	882	500	0	882	1050	-188	154	1381
5/10/2010	Final	1300	868	300	5.0%	61	1159	300	549	859	682	732	300	0	732	948	245	249	1630
5/11/2010	Final	1300	828	300	5.0%	61	1154	300	402	854	732	772	300	0	772	803	380	102	1732
5/12/2010	Final	1300	805	300	5.0%	60	1130	300	300	830	772	795	300	0	795	716	105	0	1732
5/13/2010	Final	1300	805	300	5.0%	59	1126	300	268	826	795	795	300	0	795	752	12	-32	1700
5/14/2010	Final	1300	855	300	5.0%	59	1111	300	323	811	795	795	300	0	745	772	106	23	1723
5/15/2010	Final	1300	855	300	5.0%	57	1084	300	344	784	745	745	300	0	745	764	104	44	1767
5/16/2010	Final	1300	885	300	5.0%	56	1070	300	351	770	745	745	300	0	715	747	145	51	1818
5/17/2010	Final	1300	935	300	5.0%	57	1084	300	337	784	715	715	300	0	665	716	240	37	1855
5/18/2010	Final	1300	975	300	5.0%	56	1070	300	324	770	665	665	300	0	625	644	218	24	1879
5/19/2010	Final	1300	945	300	5.0%	57	1084	300	307	784	625	655	300	0	655	634	77	7	1886
5/20/2010	Final	1300	935	300	5.0%	56	1065	300	301	765	655	665	300	0	665	663	-137	1	1887
5/21/2010	Final	1300	980	300	5.0%	57	1089	300	303	789	665	665	300	0	620	675	-111	3	1890
5/22/2010	Final	1300	1005	300	5.0%	58	1093	300	317	793	620	620	300	0	595	667	-58	17	1907
5/23/2010	Final	1300	1030	300	5.0%	59	1111	300	347	811	595	595	300	0	570	641	167	47	1954
5/24/2010	Final	1300	1065	300	5.0%	59	1116	300	366	816	570	570	500	0	735	697	285	66	2020
5/25/2010	Final	1300	1020	500	5.0%	59	1121	500	472	621	735	780	700	0	980	890	-515	-28	1992
5/26/2010	Final	1300	1020	700	5.0%	59	1126	700	602	426	980	980	700	0	980	1060	-48	-98	1894
5/27/2010	Final	1300	1035	700	5.0%	60	1140	700	635	440	980	980	700	0	965	1040	-175	-65	1829
5/28/2010	Final	1300	1050	700	5.0%	60	1145	700	628	445	965	965	700	0	950	1030	-137	-72	1757
5/29/2010	Final	1300	1055	700	5.0%	60	1140	700	631	440	950	950	700	0	945	1040	-79	-69	1688
5/30/2010	Final	1300	1025	700	5.0%	54	1019	700	646	319	945	975	700	0	975	1070	127	-54	1634
5/31/2010	Final	1300	1050	700	5.0%	39	735	700	654	35	975	975	700	0	950	1050	-101	-46	1588

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Date	Type	Friant Dam (cfs)	Gravelly Ford (cfs)	Chowchilla Bypass below Bifurcation (cfs)	SJRRP Below Chowchilla Bifurcation (cfs)	Estimated Gains/Losses (cfs)	*SJRRP San Mateo (cfs)*	Mendota Pool Demands (cfs)	Pump-In to Mendota Pool (cfs)	King's River to Mendota Pool (cfs)	DMC Inflow to Mendota Pool (cfs)	Firebaugh Wasteway Inflow to Reach 3 (cfs)	SJRRP Demand on Main Canal (cfs)	SLCC at Arroyo Canal (cfs)	CCID Release for SLCC (cfs)	*SLDMWA Wasteway Release for SLCC (cfs)*	*SLDMWA Wasteway Release for SJRRP (cfs)*
6/1/2010	Final	791	680	0	640	30	***610***	1530	77	0	1600	0	**0**	250	275	*0*	*0*
6/2/2010	Final	795	640	0	556	30	***526***	1701	77	0	1600	0	**0**	275	290	*0*	*0*
6/3/2010	Final	798	626	0	513	30	***483***	1914	77	0	1900	0	**0**	290	290	*0*	*0*
6/4/2010	Final	803	613	0	495	30	***465***	1929	77	0	1900	0	**0**	290	305	*0*	*0*
6/5/2010	Final	805	608	0	485	30	***455***	1971	77	0	1900	0	**0**	305	330	*0*	*0*
6/6/2010	Final	802	613	0	481	30	***451***	1911	77	0	2000	0	**0**	330	425	*0*	*0*
6/7/2010	Final	813	613	0	481	30	***451***	2233	77	0	2300	0	**0**	425	485	*0*	*0*
6/8/2010	Final	554	608	0	481	30	***451***	2457	77	0	2600	0	**0**	485	565	*0*	*0*
6/9/2010	Final	348	608	0	481	30	***451***	2505	77	0	2600	0	**0**	565	585	*0*	*0*
6/10/2010	Final	351	493	0	446	30	***416***	2614	77	0	2600	0	**0**	585	600	*0*	*0*
6/11/2010	Final	351	358	0	335	30	***305***	2625	77	0	2700	0	**0**	600	600	*0*	*0*
6/12/2010	Final	350	264	0	255	30	***225***	2466	77	0	2700	0	**0**	600	545	*0*	*0*
6/13/2010	Final	351	217	0	192	30	***162***	2479	77	0	2700	0	**0**	545	515	*0*	*0*
6/14/2010	Final	353	197	0	161	30	***131***	2583	77	0	2350	0	**0**	515	530	*0*	*0*
6/15/2010	Final	352	179	0	135	30	***105***	2923	54	0	3000	0	**0**	530	600	*0*	*0*
6/16/2010	Final	351	171	0	124	30	***94***	2679	37	0	3000	0	**0**	600	633	*0*	*0*
6/17/2010	Final	351	164	0	114	30	***84***	2762	37	0	3000	0	**0**	633	674	*0*	*0*
6/18/2010	Final	351	162	0	103	30	***73***	2709	37	0	2800	0	**0**	674	640	*0*	*0*
6/19/2010	Final	352	167	0	100	30	***70***	2684	37	0	2800	0	**0**	640	525	*0*	*0*
6/20/2010	Final	353	164	0	97	30	***67***	2490	37	0	2450	0	**0**	525	525	*0*	*0*
6/21/2010	Final	354	158	0	92	30	***62***	2445	37	0	2150	0	**0**	525	570	*0*	*0*
6/22/2010	Final	354	152	0	87	30	***57***	2557	19	0	2600	0	**0**	570	570	*0*	*0*
6/23/2010	Final	351	152	0	84	10	***74***	2623	19	0	2600	0	**0**	570	540	*0*	*0*
6/24/2010	Final	349	143	0	81	10	***71***	2569	19	0	2600	0	**0**	540	520	*0*	*0*
6/25/2010	Final	351	135	0	76	10	***66***	2552	19	0	2700	0	**0**	520	579	*0*	*0*
6/26/2010	Final	351	130	0	73	10	***63***	2332	19	0	2400	0	**0**	579	470	*0*	*0*
6/27/2010	Final	352	128	0	72	10	***62***	2182	19	0	2000	0	**0**	470	420	*0*	*0*
6/28/2010	Final	353	135	0	69	10	***59***	2075	19	0	2000	0	**0**	420	380	*0*	*0*
6/29/2010	Final	355	141	0	66	10	***56***	2161	19	0	2150	0	**0**	380	425	*0*	*0*
6/30/2010	Final	352	141	0	63	10	***53***	2258	19	0	2300	0	**0**	425	485	*0*	*0*

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Date	Type	Channel Capacity (cfs)	SJRRP Available Reach 3 Capacity (cfs)	SJRRP Available Downstream Capacity (cfs)	Loss Factor below San Mateo	Losses from San Mateo to Sack Dam (cfs)	Total Inflow Credit (cfs)	Flow Objective below Sack Dam (cfs)	Sack Dam (cfs)	San Luis Credit (cfs)	Flow objective above Sack Dam (cfs)	Minimum CCID Release (cfs)	CCID Release for SJRRP thru Gates (cfs)	CCID Release for SJRRP over Boards (cfs)	CCID Total Release (cfs)	USGS near Mendota (cfs)	Mendota Pool Closure (-) Losing Pool (+) Gaining Pool (cfs)	Daily Balance at Sack Dam (-) Below Target (+) Above Target (cfs)	Cumulative Balance at Sack Dam (-) Below Target (+) Above Target (cfs)
6/1/2010	Final	1300	1025	600	5.0%	31	579	579	639	0	829	854	600	0	875	995	-87	60	1648
6/2/2010	Final	1300	1010	468	5.0%	26	500	468	568	32	743	758	468	0	758	889	92	100	1748
6/3/2010	Final	1300	1010	479	5.0%	24	459	459	464	0	749	749	479	0	769	815	-58	5	1753
6/4/2010	Final	1300	995	479	5.0%	23	442	442	433	0	732	747	465	0	770	814	-57	-9	1744
6/5/2010	Final	1300	970	448	5.0%	23	432	432	434	0	737	762	448	0	778	816	-4	2	1746
6/6/2010	Final	1300	875	435	5.0%	23	428	428	441	0	758	853	435	0	860	872	-153	13	1759
6/7/2010	Final	1300	815	428	5.0%	23	428	428	468	0	853	913	428	0	913	963	-104	40	1799
6/8/2010	Final	1300	735	426	5.0%	23	428	426	476	2	911	991	426	0	991	1040	-172	50	1849
6/9/2010	Final	1300	715	419	5.0%	23	428	419	490	9	984	1004	419	0	1004	1100	-110	71	1920
6/10/2010	Final	1300	700	409	5.0%	21	395	395	492	0	980	995	409	0	1009	1120	34	97	2017
6/11/2010	Final	1300	700	420	5.0%	15	290	290	501	0	890	890	420	0	1020	1120	59	211	2228
6/12/2010	Final	1300	755	220	5.0%	11	214	214	466	0	814	814	220	0	765	975	-59	252	2480
6/13/2010	Final	1300	785	166	5.0%	8	154	154	329	0	699	699	166	0	681	811	-123	175	2655
6/14/2010	Final	1300	770	136	5.0%	7	124	124	272	0	639	654	136	0	666	749	304	148	2803
6/15/2010	Final	1300	700	113	5.0%	5	100	100	221	0	630	700	113	0	713	725	-10	121	2924
6/16/2010	Final	1300	667	83	5.0%	5	89	83	190	6	683	716	83	0	716	700	-257	107	3031
6/17/2010	Final	1300	626	74	5.0%	4	80	74	142	6	707	748	74	0	748	679	-213	68	3099
6/18/2010	Final	1300	660	65	5.0%	4	69	65	134	4	739	739	65	0	705	653	-63	69	3168
6/19/2010	Final	1300	775	71	5.0%	4	66	66	97	0	706	706	71	0	596	607	-122	31	3199
6/20/2010	Final	1300	775	73	5.0%	3	64	64	77	0	589	589	73	0	598	607	16	13	3212
6/21/2010	Final	1300	730	80	5.0%	3	59	59	78	0	584	629	80	0	650	634	277	19	3231
6/22/2010	Final	1300	730	73	5.0%	3	54	54	80	0	624	624	73	0	643	625	-36	26	3257
6/23/2010	Final	1300	760	63	5.0%	4	70	63	74	7	633	633	63	0	603	595	8	11	3268
6/24/2010	Final	1300	780	57	5.0%	4	67	57	70	10	597	597	57	0	577	570	-47	13	3281
6/25/2010	Final	1300	721	59	5.0%	3	63	59	78	4	579	638	59	0	638	569	-152	19	3300
6/26/2010	Final	1300	830	54	5.0%	3	60	54	86	6	633	633	54	0	524	554	-61	32	3332
6/27/2010	Final	1300	880	49	5.0%	3	59	49	86	10	519	519	49	0	469	522	190	37	3369
6/28/2010	Final	1300	920	49	5.0%	3	56	49	94	7	469	469	49	0	429	459	94	45	3414
6/29/2010	Final	1300	875	49	5.0%	3	53	49	91	4	429	474	49	0	474	443	30	42	3456
6/30/2010	Final	1300	815	54	5.0%	3	50	50	89	0	475	535	54	0	539	485	-22	39	3495

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Date	Type	Friant Dam (cfs)	Gravelly Ford (cfs)	Chowchilla Bypass below Bifurcation (cfs)	SJRRP Below Chowchilla Bifurcation (cfs)	Estimated Gains/Losses (cfs)	*SJRRP San Mateo (cfs)*	Mendota Pool Demands (cfs)	Pump-In to Mendota Pool (cfs)	King's River to Mendota Pool (cfs)	DMC Inflow to Mendota Pool (cfs)	Firebaugh Wasteway Inflow to Reach 3 (cfs)	SJRRP Demand on Main Canal (cfs)	SLCC at Arroyo Canal (cfs)	CCID Release for SLCC (cfs)	*SLDMWA Wasteway Release for SLCC (cfs)*	*SLDMWA Wasteway Release for SJRRP (cfs)*
7/1/2010	Final	351	133	0	62	10	***52***	2224	28	0	2450	0	**0**	485	485	*0*	*0*
7/2/2010	Final	350	135	0	66	10	***56***	2252	28	0	2300	0	**0**	485	505	*0*	*0*
7/3/2010	Final	351	154	0	69	10	***59***	2136	28	0	2150	0	**0**	505	505	*0*	*0*
7/4/2010	Final	351	150	0	73	10	***63***	2145	28	0	2150	0	**0**	505	565	*0*	*0*
7/5/2010	Final	351	152	0	76	10	***66***	2315	28	0	2250	0	**0**	565	590	*0*	*0*
7/6/2010	Final	351	162	0	79	10	***69***	2363	28	0	2350	0	**0**	590	590	*0*	*0*
7/7/2010	Final	351	171	0	78	10	***68***	2540	28	0	2650	0	**0**	590	590	*0*	*0*
7/8/2010	Final	351	173	0	75	10	***65***	2519	28	0	2650	0	**0**	590	590	*0*	*0*
7/9/2010	Final	351	169	0	75	10	***65***	2659	28	0	2800	0	**0**	590	575	*0*	*0*
7/10/2010	Final	351	158	0	75	10	***65***	2704	28	0	2800	0	**0**	575	525	*0*	*0*
7/11/2010	Final	351	164	0	75	10	***65***	2539	28	0	2650	0	**0**	525	525	*0*	*0*
7/12/2010	Final	351	173	0	75	10	***65***	2564	28	0	2500	0	**0**	525	525	*0*	*0*
7/13/2010	Final	351	175	0	75	10	***65***	2655	28	0	2500	0	**0**	525	525	*0*	*0*
7/14/2010	Final	350	177	0	73	10	***63***	2715	17	0	2800	0	**0**	525	555	*0*	*0*
7/15/2010	Final	350	173	0	75	10	***65***	2790	17	0	2900	0	**0**	555	585	*0*	*0*
7/16/2010	Final	349	164	0	72	10	***62***	2850	17	0	2900	0	**0**	585	585	*0*	*0*
7/17/2010	Final	349	158	0	67	10	***57***	2695	17	0	2300	0	**0**	585	585	*0*	*0*
7/18/2010	Final	348	158	0	64	10	***54***	2625	17	0	2600	0	**0**	585	585	*0*	*0*
7/19/2010	Final	359	164	0	60	10	***50***	2595	17	0	2400	0	**0**	585	585	*0*	*0*
7/20/2010	Final	348	156	0	59	10	***49***	2591	17	0	2400	0	**0**	585	585	*0*	*0*
7/21/2010	Final	351	150	0	59	10	***49***	2589	17	0	2400	0	**0**	585	585	*0*	*0*
7/22/2010	Final	352	150	0	57	10	***47***	2683	26	0	2600	0	**0**	585	585	*0*	*0*
7/23/2010	Final	350	154	0	55	10	***45***	2657	26	0	2700	0	**0**	585	561	*0*	*0*
7/24/2010	Final	350	143	0	52	10	***42***	2582	26	0	2800	0	**0**	561	585	*0*	*0*
7/25/2010	Final	350	150	0	51	10	***41***	2552	26	0	2200	0	**0**	585	551	*0*	*0*
7/26/2010	Final	349	143	0	48	10	***38***	2434	26	0	2300	0	**0**	551	512	*0*	*0*
7/27/2010	Final	349	135	0	46	10	***36***	2390	26	0	2450	0	**0**	512	509	*0*	*0*
7/28/2010	Final	347	137	0	45	10	***35***	2457	30	0	2600	0	**0**	509	540	*0*	*0*
7/29/2010	Final	347	141	0	43	10	***33***	2564	30	0	2600	0	**0**	540	510	*0*	*0*
7/30/2010	Final	346	150	0	43	10	***33***	2512	30	0	2450	0	**0**	510	510	*0*	*0*
7/31/2010	Final	349	162	0	43	10	***33***	2512	30	0	2450	0	**0**	510	450	*0*	*0*

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Date	Type	Channel Capacity (cfs)	SJRRP Available Reach 3 Capacity (cfs)	SJRRP Available Downstream Capacity (cfs)	Loss Factor below San Mateo	Losses from San Mateo to Sack Dam (cfs)	Total Inflow Credit (cfs)	Flow Objective below Sack Dam (cfs)	Sack Dam (cfs)	San Luis Credit (cfs)	Flow objective above Sack Dam (cfs)	Minimum CCID Release (cfs)	CCID Release for SJRRP thru Gates (cfs)	CCID Release for SJRRP over Boards (cfs)	CCID Total Release (cfs)	USGS near Mendota (cfs)	Mendota Pool Closure (-) Losing Pool (+) Gaining Pool (cfs)	Daily Balance at Sack Dam (-) Below Target (+) Above Target (cfs)	Cumulative Balance at Sack Dam (-) Below Target (+) Above Target (cfs)
7/1/2010	Final	1300	815	54	5.0%	3	49	49	82	0	534	534	54	0	539	532	-221	33	3528
7/2/2010	Final	1300	795	45	5.0%	3	53	45	80	8	530	550	45	0	550	571	-49	35	3563
7/3/2010	Final	1300	795	44	5.0%	3	56	44	83	12	549	549	44	0	549	581	-15	39	3602
7/4/2010	Final	1300	735	62	5.0%	3	60	60	84	0	565	625	62	0	627	627	-9	24	3626
7/5/2010	Final	1300	710	60	5.0%	3	63	60	93	3	625	650	60	0	650	685	67	33	3659
7/6/2010	Final	1300	710	65	5.0%	3	66	65	92	1	655	655	65	0	655	693	11	27	3686
7/7/2010	Final	1300	710	70	5.0%	3	65	65	89	0	655	655	70	0	660	699	-114	24	3710
7/8/2010	Final	1300	710	74	5.0%	3	62	62	95	0	652	652	74	0	664	711	-126	33	3743
7/9/2010	Final	1300	725	71	5.0%	3	62	62	98	0	652	652	71	0	646	707	-133	36	3779
7/10/2010	Final	1300	775	65	5.0%	3	62	62	93	0	637	637	65	0	590	700	-93	31	3810
7/11/2010	Final	1300	775	56	5.0%	3	62	56	98	6	581	581	56	0	581	672	-103	42	3852
7/12/2010	Final	1300	775	63	5.0%	3	62	62	95	0	587	587	63	0	588	659	69	33	3885
7/13/2010	Final	1300	775	65	5.0%	3	62	62	99	0	587	587	65	0	590	645	164	37	3922
7/14/2010	Final	1300	745	63	5.0%	3	60	60	89	0	585	615	63	0	618	626	-73	29	3951
7/15/2010	Final	1300	715	63	5.0%	3	62	62	70	0	617	647	63	0	648	647	-119	8	3959
7/16/2010	Final	1300	715	59	5.0%	3	59	59	69	0	644	644	59	0	644	689	-57	10	3969
7/17/2010	Final	1300	715	53	5.0%	3	54	53	79	1	638	638	53	0	638	730	403	26	3995
7/18/2010	Final	1300	715	47	5.0%	3	51	47	96	4	632	632	47	0	632	711	53	49	4044
7/19/2010	Final	1300	715	47	5.0%	3	47	47	83	0	632	632	47	0	632	675	214	36	4080
7/20/2010	Final	1300	715	49	5.0%	2	47	47	69	0	632	632	47	0	632	647	196	22	4102
7/21/2010	Final	1300	715	45	5.0%	2	47	45	66	2	630	630	45	0	630	646	191	21	4123
7/22/2010	Final	1300	715	45	5.0%	2	45	45	69	0	630	630	45	0	630	638	81	24	4147
7/23/2010	Final	1300	739	44	5.0%	2	43	43	80	0	628	628	44	0	605	628	-32	37	4184
7/24/2010	Final	1300	715	47	5.0%	2	40	40	103	0	601	625	47	0	632	625	-181	63	4247
7/25/2010	Final	1300	749	40	5.0%	2	39	39	159	0	624	624	40	0	591	626	446	120	4367
7/26/2010	Final	1300	788	41	5.0%	2	36	36	199	0	587	587	41	0	553	568	271	163	4530
7/27/2010	Final	1300	791	38	5.0%	2	34	34	108	0	546	546	38	0	547	524	-12	74	4604
7/28/2010	Final	1300	760	31	5.0%	2	33	31	73	2	540	571	31	0	571	560	-133	42	4646
7/29/2010	Final	1300	790	30	5.0%	2	31	30	73	1	570	570	30	0	540	588	-24	43	4689
7/30/2010	Final	1300	790	33	5.0%	2	31	31	67	0	541	541	33	0	543	593	68	36	4725
7/31/2010	Final	1300	850	36	5.0%	2	31	31	71	0	541	541	36	0	486	554	72	40	4765

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Date	Type	Friant Dam (cfs)	Gravelly Ford (cfs)	Chowchilla Bypass below Bifurcation (cfs)	SJRRP Below Chowchilla Bifurcation (cfs)	Estimated Gains/Losses (cfs)	*SJRRP San Mateo (cfs)*	Mendota Pool Demands (cfs)	Pump-In to Mendota Pool (cfs)	King's River to Mendota Pool (cfs)	DMC Inflow to Mendota Pool (cfs)	Firebaugh Wasteway Inflow to Reach 3 (cfs)	SJRRP Demand on Main Canal (cfs)	SLCC at Arroyo Canal (cfs)	CCID Release for SLCC (cfs)	*SLDMWA Wasteway Release for SLCC (cfs)*	*SLDMWA Wasteway Release for SJRRP (cfs)*
8/1/2010	Final	350	152	0	42	10	***32***	2362	30	0	2250	0	**0**	450	490	*0*	*0*
8/2/2010	Final	349	143	0	42	10	***32***	2401	30	0	2250	0	**0**	490	515	*0*	*0*
8/3/2010	Final	355	137	0	42	10	***32***	2546	36	0	2500	0	**0**	515	595	*0*	*0*
8/4/2010	Final	358	135	0	40	10	***30***	2701	36	0	2650	0	**0**	595	595	*0*	*0*
8/5/2010	Final	357	137	0	42	10	***32***	2682	36	0	2750	0	**0**	595	595	*0*	*0*
8/6/2010	Final	357	143	0	46	10	***36***	2538	53	0	2600	0	**0**	595	540	*0*	*0*
8/7/2010	Final	359	139	0	46	10	***36***	2443	53	0	2200	0	**0**	540	576	*0*	*0*
8/8/2010	Final	354	132	0	46	10	***36***	2281	53	0	1950	0	**0**	576	548	*0*	*0*
8/9/2010	Final	350	137	0	46	10	***36***	2175	53	0	1750	0	**0**	548	514	*0*	*0*
8/10/2010	Final	349	141	0	45	10	***35***	2149	41	0	2000	0	**0**	514	519	*0*	*0*
8/11/2010	Final	348	133	0	45	10	***35***	2303	41	0	2250	0	**0**	519	520	*0*	*0*
8/12/2010	Final	348	128	0	41	10	***31***	2425	41	0	2400	0	**0**	520	518	*0*	*0*
8/13/2010	Final	350	125	0	37	10	***27***	2415	41	0	2400	0	**0**	518	455	*0*	*0*
8/14/2010	Final	352	132	0	41	10	***31***	2315	41	0	2400	0	**0**	455	415	*0*	*0*
8/15/2010	Final	352	146	0	47	10	***37***	2192	41	0	2100	0	**0**	415	385	*0*	*0*
8/16/2010	Final	350	148	0	51	10	***41***	2104	41	0	1700	0	**0**	385	385	*0*	*0*
8/17/2010	Final	352	146	0	52	10	***42***	2214	41	0	2150	0	**0**	385	405	*0*	*0*
8/18/2010	Final	342	150	0	52	10	***42***	2470	41	0	2700	0	**0**	405	525	*0*	*0*
8/19/2010	Final	325	146	0	53	10	***43***	2445	44	0	2500	0	**0**	525	525	*0*	*0*
8/20/2010	Final	324	143	0	55	10	***45***	2523	44	0	2300	0	**0**	525	525	*0*	*0*
8/21/2010	Final	323	130	0	50	10	***40***	2327	44	0	2150	0	**0**	525	485	*0*	*0*
8/22/2010	Final	323	132	0	43	10	***33***	2277	44	0	1800	0	**0**	485	460	*0*	*0*
8/23/2010	Final	324	133	0	39	10	***29***	2069	44	0	1950	0	**0**	460	445	*0*	*0*
8/24/2010	Final	325	132	0	37	10	***27***	2104	38	0	2100	0	**0**	445	475	*0*	*0*
8/25/2010	Final	324	130	0	37	10	***27***	2252	38	0	2350	0	**0**	475	445	*0*	*0*
8/26/2010	Final	323	128	0	36	10	***26***	2243	38	0	2350	0	**0**	445	380	*0*	*0*
8/27/2010	Final	337	123	0	35	10	***25***	2206	38	0	2100	0	**0**	380	320	*0*	*0*
8/28/2010	Final	350	120	0	34	10	***24***	2126	38	0	2100	0	**0**	320	320	*0*	*0*
8/29/2010	Final	350	125	0	33	10	***23***	2031	38	0	2050	0	**0**	320	320	*0*	*0*
8/30/2010	Final	350	139	0	32	10	***22***	1810	38	0	1700	0	**0**	320	320	*0*	*0*
8/31/2010	Final	350	146	0	42	10	***32***	1860	38	0	1700	0	**0**	320	390	*0*	*0*

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Date	Type	Channel Capacity (cfs)	SJRRP Available Reach 3 Capacity (cfs)	SJRRP Available Downstream Capacity (cfs)	Loss Factor below San Mateo	Losses from San Mateo to Sack Dam (cfs)	Total Inflow Credit (cfs)	Flow Objective below Sack Dam (cfs)	Sack Dam (cfs)	San Luis Credit (cfs)	Flow objective above Sack Dam (cfs)	Minimum CCID Release (cfs)	CCID Release for SJRRP thru Gates (cfs)	CCID Release for SJRRP over Boards (cfs)	CCID Total Release (cfs)	USGS near Mendota (cfs)	Mendota Pool Closure (-) Losing Pool (+) Gaining Pool (cfs)	Daily Balance at Sack Dam (-) Below Target (+) Above Target (cfs)	Cumulative Balance at Sack Dam (-) Below Target (+) Above Target (cfs)
8/1/2010	Final	1300	810	36	5.0%	2	30	30	63	0	480	520	36	0	526	535	115	33	4798
8/2/2010	Final	1300	785	30	5.0%	2	30	30	61	0	520	545	30	0	545	579	152	31	4829
8/3/2010	Final	1300	705	28	5.0%	2	30	28	63	2	543	623	28	0	623	634	43	35	4864
8/4/2010	Final	1300	705	30	5.0%	2	28	28	59	0	623	623	30	0	625	669	46	31	4895
8/5/2010	Final	1300	705	34	5.0%	2	30	30	60	0	625	625	34	0	629	664	-74	30	4925
8/6/2010	Final	1300	760	34	5.0%	2	34	34	61	0	629	629	34	0	574	643	-88	27	4952
8/7/2010	Final	1300	724	36	5.0%	2	34	34	59	0	574	610	36	0	612	626	215	25	4977
8/8/2010	Final	1300	752	33	5.0%	2	34	33	60	1	609	609	33	0	581	607	304	27	5004
8/9/2010	Final	1300	786	29	5.0%	2	34	29	53	5	577	577	29	0	543	559	391	24	5028
8/10/2010	Final	1300	781	34	5.0%	2	33	33	42	0	547	552	34	0	553	523	117	9	5037
8/11/2010	Final	1300	780	35	5.0%	2	33	33	35	0	552	553	35	0	555	533	14	2	5039
8/12/2010	Final	1300	782	33	5.0%	2	29	29	32	0	549	549	33	0	551	549	-13	3	5042
8/13/2010	Final	1300	845	30	5.0%	1	26	26	28	0	544	544	30	0	485	523	-24	2	5044
8/14/2010	Final	1300	885	28	5.0%	2	29	28	29	1	483	483	28	0	443	491	-126	1	5045
8/15/2010	Final	1300	915	34	5.0%	2	35	34	36	1	449	449	34	0	419	503	52	2	5047
8/16/2010	Final	1300	915	43	5.0%	2	39	39	54	0	424	424	43	0	428	469	378	15	5062
8/17/2010	Final	1300	895	43	5.0%	2	40	40	45	0	425	445	47	0	452	461	28	5	5067
8/18/2010	Final	1300	775	40	5.0%	2	40	40	28	0	445	565	40	0	565	533	-283	-12	5055
8/19/2010	Final	1300	775	43	5.0%	2	41	41	51	0	566	566	43	0	568	604	-89	10	5065
8/20/2010	Final	1300	775	41	5.0%	2	43	41	44	2	566	566	41	0	566	611	180	3	5068
8/21/2010	Final	1300	815	41	5.0%	2	38	38	56	0	563	563	41	0	526	576	151	18	5086
8/22/2010	Final	1300	840	28	5.0%	2	31	28	54	3	513	513	28	0	488	544	456	26	5112
8/23/2010	Final	1300	855	28	5.0%	1	28	28	49	0	488	488	26	0	471	504	96	21	5133
8/24/2010	Final	1300	825	28	5.0%	1	26	26	25	0	471	501	28	0	503	500	-35	-1	5132
8/25/2010	Final	1300	855	24	5.0%	1	26	24	23	2	499	499	24	0	469	493	-139	-1	5131
8/26/2010	Final	1300	920	23	5.0%	1	25	23	5.4	2	468	468	23	0	403	441	-165	-18	5113
8/27/2010	Final	1300	980	22	5.0%	1	24	22	5.3	2	402	402	22	0	342	401	49	-17	5097
8/28/2010	Final	1300	980	18	5.0%	1	23	18	33	5	338	338	18	0	338	378	-2	15	5112
8/29/2010	Final	1300	980	14	5.0%	1	22	14	44	8	334	334	14	0	334	376	-35	30	5142
8/30/2010	Final	1300	980	19	5.0%	1	21	19	43	2	339	339	19	0	339	391	94	24	5166
8/31/2010	Final	1300	910	0	5.0%	2	30	0	38	30	320	390	0	0	390	399	130	0	5166

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Date	Type	Friant Dam (cfs)	Gravelly Ford (cfs)	Chowchilla Bypass below Bifurcation (cfs)	SJRRP Below Chowchilla Bifurcation (cfs)	Estimated Gains/Losses (cfs)	*SJRRP San Mateo (cfs)*	Mendota Pool Demands (cfs)	Pump-In to Mendota Pool (cfs)	King's River to Mendota Pool (cfs)	DMC Inflow to Mendota Pool (cfs)	Firebaugh Wasteway Inflow to Reach 3 (cfs)	SJRRP Demand on Main Canal (cfs)	SLCC at Arroyo Canal (cfs)	CCID Release for SLCC (cfs)	*SLDMWA Wasteway Release for SLCC (cfs)*	*SLDMWA Wasteway Release for SJRRP (cfs)*
9/1/2010	Final	349	152	0	46	10	***36***	1837	41	0	1850	0	**0**	390	390	*0*	*0*
9/2/2010	Final	349	152	0	48	10	***38***	1872	41	0	1850	0	**0**	390	340	*0*	*0*
9/3/2010	Final	351	152	0	47	10	***37***	1786	41	0	1700	0	**0**	340	340	*0*	*0*
9/4/2010	Final	352	152	0	51	10	***41***	1711	28	0	1700	0	**0**	340	305	*0*	*0*
9/5/2010	Final	352	150	0	53	10	***43***	1661	28	0	1600	0	**0**	305	305	*0*	*0*
9/6/2010	Final	352	148	0	55	10	***45***	1561	28	0	1500	0	**0**	305	235	*0*	*0*
9/7/2010	Final	351	146	0	53	10	***43***	1734	45	0	1650	0	**0**	235	235	*0*	*0*
9/8/2010	Final	351	148	0	53	10	***43***	1897	45	0	1800	0	**0**	235	220	*0*	*0*
9/9/2010	Final	344	150	0	55	10	***45***	1761	45	0	1650	0	**0**	220	250	*0*	*0*
9/10/2010	Final	350	152	0	56	10	***46***	1821	45	0	1700	0	**0**	250	300	*0*	*0*
9/11/2010	Final	350	150	0	59	10	***49***	1676	45	0	1500	0	**0**	300	240	*0*	*0*
9/12/2010	Final	349	150	0	59	10	***49***	1616	45	0	1500	0	**0**	240	240	*0*	*0*
9/13/2010	Final	348	160	0	62	10	***52***	1650	45	0	1600	0	**0**	240	260	*0*	*0*
9/14/2010	Final	350	160	0	69	10	***59***	1762	45	0	1600	0	**0**	260	290	*0*	*0*
9/15/2010	Final	352	164	0	67	10	***57***	1794	29	0	1700	0	**0**	290	350	*0*	*0*
9/16/2010	Final	350	164	0	67	10	***57***	1782	29	0	1700	0	**0**	350	350	*0*	*0*
9/17/2010	Final	351	169	0	69	10	***59***	1777	29	0	1700	0	**0**	350	325	*0*	*0*
9/18/2010	Final	351	164	0	69	10	***59***	1785	29	0	1700	0	**0**	325	295	*0*	*0*
9/19/2010	Final	351	162	0	67	10	***57***	1695	29	0	1600	0	**0**	295	275	*0*	*0*
9/20/2010	Final	351	167	0	72	10	***62***	1676	29	0	1600	0	**0**	275	255	*0*	*0*
9/21/2010	Final	350	169	0	73	10	***63***	1745	29	0	1600	0	**0**	255	245	*0*	*0*
9/22/2010	Final	350	160	0	70	10	***60***	1757	29	0	1600	0	**0**	245	245	*0*	*0*
9/23/2010	Final	352	160	0	67	10	***57***	1728	29	0	1600	0	**0**	245	245	*0*	*0*
9/24/2010	Final	355	167	0	69	10	***59***	1768	29	0	1700	0	**0**	245	270	*0*	*0*
9/25/2010	Final	353	167	0	75	10	***65***	1768	29	0	1700	0	**0**	270	270	*0*	*0*
9/26/2010	Final	353	171	0	75	10	***65***	1748	29	0	1700	0	**0**	270	310	*0*	*0*
9/27/2010	Final	353	171	0	76	10	***66***	1706	29	0	1600	0	**0**	310	310	*0*	*0*
9/28/2010	Final	353	164	0	75	10	***65***	1717	29	0	1600	0	**0**	310	295	*0*	*0*
9/29/2010	Final	353	160	0	73	10	***63***	1708	29	0	1600	0	**0**	295	295	*0*	*0*
9/30/2010	Final	351	162	0	72	10	***62***	1798	29	0	1700	0	**0**	295	280	*0*	*0*
							85168										
							168928										

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Date	Type	Channel Capacity (cfs)	SJRRP Available Reach 3 Capacity (cfs)	SJRRP Available Downstream Capacity (cfs)	Loss Factor below San Mateo	Losses from San Mateo to Sack Dam (cfs)	Total Inflow Credit (cfs)	Flow Objective below Sack Dam (cfs)	Sack Dam (cfs)	San Luis Credit (cfs)	Flow objective above Sack Dam (cfs)	Minimum CCID Release (cfs)	CCID Release for SJRRP thru Gates (cfs)	CCID Release for SJRRP over Boards (cfs)	CCID Total Release (cfs)	USGS near Mendota (cfs)	Mendota Pool Closure (-) Losing Pool (+) Gaining Pool (cfs)	Daily Balance at Sack Dam (-) Below Target (+) Above Target (cfs)	Cumulative Balance at Sack Dam (-) Below Target (+) Above Target (cfs)
9/1/2010	Final	1300	910	0	5.0%	2	34	0	14	34	390	390	0	0	390	410	-74	0	5166
9/2/2010	Final	1300	960	0	5.0%	2	36	0	0	36	390	390	0	0	340	378	-55	0	5166
9/3/2010	Final	1300	960	0	5.0%	2	35	0	0	35	340	340	0	0	340	351	10	0	5166
9/4/2010	Final	1300	995	0	5.0%	2	39	0	0	39	340	340	0	0	305	330	-56	0	5166
9/5/2010	Final	1300	995	0	5.0%	2	41	0	0	41	305	305	0	0	305	316	-8	0	5166
9/6/2010	Final	1300	1065	0	5.0%	2	43	0	0	43	305	305	0	0	235	293	-10	0	5166
9/7/2010	Final	1300	1065	0	5.0%	2	41	0	0	41	235	235	0	0	235	262	-2	0	5166
9/8/2010	Final	1300	1080	0	5.0%	2	41	0	0	41	235	235	0	0	220	243	11	0	5166
9/9/2010	Final	1300	1050	0	5.0%	2	43	0	0	43	220	250	0	0	250	263	23	0	5166
9/10/2010	Final	1300	1000	0	5.0%	2	44	0	0	44	250	300	0	0	300	302	32	0	5166
9/11/2010	Final	1300	1060	0	5.0%	2	47	0	0	47	300	300	0	0	240	290	84	0	5166
9/12/2010	Final	1300	1060	0	5.0%	2	47	0	0	47	240	240	0	0	240	262	24	0	5166
9/13/2010	Final	1300	1040	0	5.0%	3	49	0	0	49	240	260	0	0	260	276	-44	0	5166
9/14/2010	Final	1300	1010	0	5.0%	3	56	0	0	56	260	290	0	0	290	300	61	0	5166
9/15/2010	Final	1300	950	0	5.0%	3	54	0	0	54	290	350	0	0	350	338	11	0	5166
9/16/2010	Final	1300	950	0	5.0%	3	54	0	0	54	350	350	0	0	350	357	-1	0	5166
9/17/2010	Final	1300	975	0	5.0%	3	56	0	0	56	350	350	0	0	325	333	-8	0	5166
9/18/2010	Final	1300	1005	0	5.0%	3	56	0	0	56	325	325	0	0	295	299	0	0	5166
9/19/2010	Final	1300	1025	0	5.0%	3	54	0	0	54	295	295	0	0	275	280	12	0	5166
9/20/2010	Final	1300	1045	0	5.0%	3	59	0	0	59	275	275	0	0	255	266	-12	0	5166
9/21/2010	Final	1300	1055	0	5.0%	3	60	0	0	60	255	255	0	0	245	255	56	0	5166
9/22/2010	Final	1300	1055	0	5.0%	3	57	0	0	57	245	245	0	0	245	250	71	0	5166
9/23/2010	Final	1300	1055	0	5.0%	3	54	0	0	54	245	245	0	0	245	277	45	0	5166
9/24/2010	Final	1300	1030	0	5.0%	3	56	0	0	56	245	270	0	0	270	300	-17	0	5166
9/25/2010	Final	1300	1030	0	5.0%	3	62	0	0	62	270	270	0	0	270	333	-23	0	5166
9/26/2010	Final	1300	990	0	5.0%	3	62	0	0	62	270	310	0	0	310	351	-43	0	5166
9/27/2010	Final	1300	990	0	5.0%	3	63	0	0	63	310	310	0	0	310	360	14	0	5166
9/28/2010	Final	1300	1005	0	5.0%	3	62	0	0	62	310	310	0	0	295	338	26	0	5166
9/29/2010	Final	1300	1005	0	5.0%	3	60	0	0	60	295	295	0	0	295	319	19	0	5166
9/30/2010	Final	1300	1020	0	5.0%	3	59	0	0	59	295	295	0	0	280	315	10	0	5166
						4261		55633	60850.7	25274								5165.7	
						8452		110346.4	120695.6	50130								10246	

Worksheet	Field	Units	Comment
Friant Dam Realtime	0		Instantaneous changes in Friant Dam release to meet new flow targets according to valve opening rating tables. Minor adjustments to maintain flows are not recorded.
	Date-Time	MDY H:M A/P	
	River Outlets	ft^3/s	
	Hatchery Outlet	ft^3/s	
SJRRP 24 Hour	0		record of flow assumptions used to set operations for the day, typically following the 8 am coordination call.
	Date	MDY	8 am Communication
	Type	text	Specify whether record is forcast for the next 24 hours, adjusted to reflect new information in one or more fields on a subsequent date, or QA/QC data, adjustements are reported in the comment field
	Friant Dam	cfs	instantaneous total release from Friant Dam including hatchery, typically reported around 6 am.
	Gravelly Ford	cfs	Estimate of the daily flows likely to pass the Gravelly Ford gage based on an instantaneous reading, typically collected around 6 am, measurements if available, and potentially adjusted based on upstream operations, observations, and operator experience.
	Chowchilla Bifurcation	cfs	Estimate of the daily flows entering into the Chowchilla Bypass, CDEC gage CBP
	SJRRP Below Chowchilla Bifurcation	cfs	Estimate of daily flows requested to pass down the river based on an instantaneous real-time reading, typically collected around 6 am, measurementes if available, and potentially adjusted based on upstream operations, observations, and operator experience.
	Estimated Gains/Losses	cfs	estimate of the daily difference between Chowchilla and flows entering Mendota Pool based on observations of the San Mateo Staff gage or measured flows when available. Values are assumed from the most recent measurement when access is not possible.

Worksheet	Field	Units	Comment
	SJRRP San Mateo	cfs	Estimate of the daily flows entering Mendota Pool either measured at the Staff gage or calculated as the Bifurcation Gage minus estimated losses. SLDMWA will make daily staff gage observations when access permits.
	DMC Inflow to Mendota Pool	cfs	Estimated daily DMC flows into Mendota Pool
	Firebaugh Wasteway Inflow to Reach 3	cfs	DMC deliveries to Reach 3 via the Firebaugh Wasteway to maintain water quality
	Pump-In to Mendota Pool	cfs	Estimated daily groundwater pumping into Mendota Pool
	King's River to Mendota Pool	cfs	Estimated daily flood diversions through the James Bypass
	Demands at Mendota Pool	cfs	Estimated daily water deliveries within Mendota Pool including releases for SLCC
	SJRRP Demand on Main Canal	cfs	Excess inflows into Mendota Pool deliviered for the SJRRP to Los Banos Creek to avoid exceeding downstream targets
	SLCC at Arroyo Canal	cfs	Estimated daily demand at Arroyo Canal
	CCID Release for SLCC	cfs	Estimated daily releases from Mendota Dam to meet demand at Arroyo Canal based on operations tables and operator experience.
	Channel Capacity	cfs	estimate of channel capacity limits in Reach 3 to be provided by Program Staff in coordination with Operators
	SJRRP Available Capacity	cfs	calculated limit on conveyance of SJRRP flows (Channel Capacity - CCID Release for SLCC)
	CCID Release for SJRRP	cfs	assumed release from Mendota Pool to meet SJRRP demands at Sack Dam, anticipated to equal flows at San Mateo minus losses
	CCID Total Release	cfs	sum of SLCC and SJRRP release from Mendota Dam for setting the gates over the next 24 hour period.
	Loss Factor below San Mateo	factor	amount of assumed loss from San Mateo to Sack Dam
	Losses from San Mateo to Sack Dam	cfs	flow rate loss = San Mateo - Factor except when recapture occurs
	Below Sack Dam	cfs	flows passing Sack Dam anticipated to equal flows at San Mateo times a loss factor
	San Luis Credit	cfs	difference between SJRRP flows into and out of Mendota Pool minus losses
	Mendota Pool Closure	cfs	error term (-) gains in the pool, (+) losses in the pool
	SJRRP Cumulative	cfs	(-) Owe Pool Users, (+) Owe SJRRP
	Comment	cfs	text notes from operations discussions

Attachment 8:

Protected Flows Notifications

United States Department of the Interior

BUREAU OF RECLAMATION
Mid-Pacific Regional Office
2800 Cottage Way
Sacramento, California 95825-1898

TAKE PRIDE IN AMERICA

IN REPLY REFER TO:

MP-170
LAW-1.00

NOV 10 2009

Mr. Steve Chedester
Executive Director
San Joaquin River Exchange
Contractors Water Authority
P.O. Box 2115, 541 H Street
Los Banos, CA 93635

Subject: San Joaquin River Restoration Program – Response to the Exchange Contractors Letters Regarding the Water Year 2010 Interim Flows Project

Dear ~~Mr. Chedester~~ Steve:

This letter is in response to your September 21, 2009, letter that expressed concerns regarding the Bureau of Reclamation's Water Year (WY) 2010 Interim Flows Project (Project), and your October 30, 2009, letter regarding Reclamation's compliance with Order Water Right 2009-0058-DWR (Order) for the Project issued by the State Water Resources Control Board (State Board). I appreciated your willingness to come and meet with me and my staff on November 6, 2009, to discuss your concerns with the Project. At this meeting, the Central California Irrigation District (CCID) and the San Luis Canal Company (SLCC) each stated that they will allow the Interim Flows, which are protected by the Order, to pass their facilities. We also discussed the importance of working together to expeditiously finish the following: 1) an operations plan for tracking and, if necessary, reducing Interim Flows; 2) financial assistance agreements with CCID and SLCC to reimburse future costs that they may incur as a result of the Interim Flows; and 3) an agreement addressing legal liability that CCID and SLCC believe may be associated with operating their facilities to pass the Interim Flows. I am committed to finalizing these as soon as possible, and with your cooperation, believe they can be finished before the Interim Flows in the spring.

Regarding your recent letters, your September 21, 2009, letter states in several places that you believe that Reclamation has not complied with applicable Federal and State laws with regard to the Project. I provided you with a detailed explanation as to why we believe the Project is in compliance with all applicable Federal and State laws in my September 1, 2009, letter, which I will not reiterate here. In your October 30, 2009, letter you assert that Reclamation is not in compliance with the Order. To the contrary, we believe that Reclamation is fully compliant with the conditions in the Order, and addressed below are each of the concerns you raise regarding the specific conditions you feel Reclamation is not complying with.

Under Condition 8 of the Order, Reclamation is to implement the Seepage Monitoring and Management Plan (Plan) as described in the Draft WY 2010 Interim Flows Environmental

Assessment (EA) and install groundwater monitoring wells at specific locations. Reclamation is to also establish groundwater thresholds to determine when impacts to agricultural lands or levee stability are imminent. You express concerns that no thresholds for determining impacts have been established and that no methodology for reporting has been provided. We have established thresholds for the wells currently in place with assistance from the U.S. Geological Survey. These thresholds, which are conservative in nature, have been shared with you by Reclamation staff in a previous meeting and they will continue to evolve as more detailed, location-specific and crop-specific thresholds are developed. We will continue to share this information with you and seek your input as new and updated information becomes available.

Under Condition 9 of the Order, Reclamation is to conduct a daily evaluation of groundwater levels and flow and stage levels when flows are greater than 475 cubic feet per second (cfs) in Reaches 2A and 3 and post the results of this evaluation to a website. You express concerns that this information is not available on the website. We are prepared to implement this condition when flows are greater than 475 cfs in Reach 2A and 3.

Condition 14 of the Order states that the Order shall not be construed as modifying or amending the terms of the Exchange Contract or Section 10004(j) of Public Law 111-11. You express concerns with regard to the operating requirements for Mendota Pool in the Exchange Contract and specifically with Article 11 of the Exchange Contract which requires maintaining the elevation of Mendota Pool at specific levels depending on whether water deliveries are being made via the San Joaquin River or the Delta-Mendota Canal. From your letter, it appears that you believe that the Mendota Pool elevation must be maintained at an elevation of 13.0 to 14.0 feet during Interim Flows and that this elevation would impact water users in the Mendota Pool and Fresno Slough. However, the Exchange Contract states that "during the times when water is being delivered to Mendota Pool from the San Joaquin River and/or Fresno Slough *under this contract* the water surface in the Pool will be maintained, in so far as practicable, between elevations 160.0 and 161.0 feet, U.S. Geological Survey datum, which is equivalent to heights of 13.0 feet and 14.0 feet on the gage at Mendota Dam" (Article 11, Exchange Contract, emphasis added). Interim Flows are not deliveries under the Exchange Contract unless otherwise authorized by Reclamation, and thus, we do not see that a change in the elevation of the Mendota Pool is required under the Exchange Contract. Also, and as discussed during our November 6, 2009, meeting, frequent monitoring and coordination of flows coming into and out of Mendota Pool will allow for CCID to maintain a normal water surface elevation without jeopardizing the Mendota Dam. Reclamation has committed to providing technical and financial assistance to accomplish this.

Your concerns regarding Condition 6 of the Order pertain to the Lower San Joaquin Levee District (Levee District). Reclamation is working on a funding agreement separately with the Levee District to address any additional operations and maintenance resource requirements as a result of the Interim Flows. As it relates to the Levee District, Condition 6 of the Order states that utilizing the Sand Slough Control Structure as a diversion point for Interim Flows and the introduction of flows in the Eastside Bypass are conditioned on execution of any necessary agreements with the Levee District for the operation, inspection, and maintenance of flood control facilities. We are not aware of any agreement necessary for the Levee District to divert flows at the Sand Slough Control Structure since there is no alternative route for water to flow at this time and the Levee District will not need to take any action for such diversion. Additionally, we are not requesting the Levee

District to take any action regarding the rediversion of Interim Flows downstream of the Sand Slough Control Structure. If and when such a request is necessary, Reclamation will enter into the appropriate agreements. You also express concerns on behalf of the Levee District that flowage easements may be needed to route Interim Flows into the Eastside Bypass. The Levee District's current practice is to not maintain the historical river channel from the San Joaquin River Control Structure at Sand Slough to the confluence with the Mariposa Bypass, and flows have not been allowed to pass into the natural river channel at that location for many decades. In essence, the San Joaquin River Control Structure has functionally become a permanent diversion point and all river flows now pass through the Eastside Bypass. Because Interim Flows will be diverted into the Eastside Bypass as a result of the flood project, Reclamation has determined that no flowage easements are needed.

Condition 12 states that Reclamation is responsible for operating under the Order in a way that does not result in damage that could result in imminent failure of facilities. Reclamation is complying with this condition.

Condition 22 of the Order requires the collection of baseline and on-going water quality and sediment data. Results of the data collection must be submitted to the Central Valley Regional Water Quality Control Board (Regional Board) and the State Board within 2 months of collection. You express concerns that this information is not available on the website. Consistent with the requirements of the Order, Reclamation is conducting the monitoring activities outlined in this condition and will submit the required monitoring data to the Regional Board and the State Board. The monitoring data will be available to the public after submitting it to the Regional Board and State Board.

Condition 7 of the Order specifies that Reclamation must monitor and report stream flows at seven locations when Interim Flows are expected to be at those locations. Monitoring shall be conducted on a daily basis and posted to a publically available website. You express concerns that three of the monitoring gages have not been installed and are not reporting on the website. When the Interim Flows reach each of the locations along the river where the Order requires monitoring, Reclamation will conduct monitoring and reporting of stream flows and make this information available to the public by posting it on a publicly available website.

There are several additional issues you have raised, primarily in your September 21, 2009, letter, which I would like to address.

Groundwater Seepage Impacts

I understand your concerns regarding the potential for seepage impacts that may result from the Project and believe that you have been clear that potential seepage impacts are of paramount importance to landowners you represent adjacent to the San Joaquin River. Reclamation takes this issue very seriously. It appears that the potential for the Interim Flows to cause seepage impacts is our biggest point of disagreement. I would like to describe the three key factors that we took into consideration when we determined that the Project's seepage impacts are less than significant. First, we have limited the Project's maximum possible releases to levels that our analysis and discussions with landowners indicate would not cause seepage impacts. The analysis and information from landowners that we used as the basis for determining these non-damaging flows are described in detail in the EA. Second, the releases will be gradually and incrementally increased based on information collected from monitoring activities, including shallow groundwater monitoring wells, and communications with local landowners. Releases will be held for a period of time after each increase to allow for an assessment of changes in shallow groundwater conditions at the new flow level. These gradual increases and holding of flows after each increase will allow Reclamation time to evaluate river and shallow groundwater conditions for potential or imminent seepage impacts prior to further increasing flows. In the event that seepage impacts appear imminent, Reclamation will reduce flows or take other measures to the extent necessary to address any material adverse impacts from groundwater seepage. Lastly, the Project includes a Seepage Monitoring and Management Plan (Plan) that describes management objectives for groundwater and levee seepage, approaches for detecting seepage, monitoring conditions indicating that seepage management objectives have been attained, and potential actions that could be taken to address seepage before it impacts adjacent lands. The Plan includes the use of all available groundwater monitoring wells at the time of the Interim Flows, as well as provides for a communications strategy for landowners to contact Reclamation if seepage impacts appear likely. As required by Section 10004(h)(3) of Public Law 111-11, the Plan includes the reduction of Interim Flows to the extent necessary to address any material adverse impacts from groundwater seepage caused by such flows that the Secretary of the Interior identifies based on the monitoring program of the Secretary. With limiting flows to non-damaging amounts, gradually and incrementally increasing flows as we assess conditions, and implementation of the Plan, we determined that no significant impacts would occur as a result of groundwater seepage from Interim Flows.

Data Collection Opportunities

In your September 21, 2009, letter, you express concerns that there will be no meaningful data collected during the fall Interim Flows below Mendota Pool. However, we believe that meaningful data will be collected during the fall Interim Flows that will provide useful information on flows, temperatures, fish needs, seepage losses, recirculation, and recapture and reuse conditions and help shape future Program decisions. Some examples of monitoring activities planned for the Project include the following:

- Monitoring the relationship between the water surface elevation in the river and the elevation of the adjacent shallow groundwater table;

- Monitoring flow quantities and downstream extent in all reaches to provide information to better calibrate the Program's modeling tools and to verify the assumptions in Exhibit B of the Settlement;

- Monitoring hydrologic and hydraulic characteristics, such as flow velocities and water surface elevations at different flows, and flow and water temperature relationships to provide information to better calibrate the Program's modeling tools;

- Assessing the effectiveness of the Hills Ferry Barrier as required under Public Law 111-11;

- Assessing characteristics of different structures throughout Reaches 1 through 5 to evaluate fish passage under different flow conditions; and,

- Assessing opportunities and challenges related to the recapture of Interim Flows at different locations throughout the San Joaquin River system and in the Sacramento-San Joaquin River Delta.

Operation of Mendota Dam and Sack Dam

Your September 21, 2009, letter indicates to me that CCID and SLCC intend to store or divert Interim Flows without authorization by Reclamation. As I stated earlier, at our November 6, 2009, meeting, both CCID and SLCC clarified to me that they will allow all Interim Flows to pass downstream of their facilities unless otherwise authorized by Reclamation. Under Paragraph 13(h) of the Settlement, Reclamation is required to manage and control all Interim Flows from Friant Dam to the Sacramento-San Joaquin Delta and undertake all reasonable measures to protect the rights to manage and control the Interim Flows, including initiating appropriate enforcement proceedings to prevent unlawful diversions of, interference with, or taking of Interim Flows. For this reason, Reclamation petitioned the State Board to protect the Interim Flow releases under California Water Code Section 1707. Pursuant to Condition 10 of the Order, I will also advise you that the Interim Flows are protected under the Order, Section 1707 of the California Water Code, and the Settlement from unauthorized storage or diversion.

Settlement Schedule for Interim Flows

In both your September 21 and October 30 letters, you state that Reclamation is ignoring provisions in the Settlement that allow for delaying the release of Interim Flows, and that we are choosing to instead "roll over" or "ignore" public agencies, contractors, and landowners in an attempt to meet the schedule. These assertions are inaccurate. The Settlement schedule, including the mandate for the latest possible date to initiate the release of Interim Flows from Friant Dam, has been known for over 3 years. Nothing in the Settlement or Public Law 111-11 allows Reclamation to unilaterally decide not to comply with that mandate. Additionally, the timing of the enactment of Public Law 111-11 has not affected the ability to prepare for the release of Interim Flows such that a delay is justified. In fact, in 2008, in anticipation of Public Law 111-11 passing, Reclamation began the necessary permitting, environmental compliance, and coordination activities for the Interim Flows such that they would be completed before the October 1, 2009, deadline. Additionally, many of the last additions to Public Law 111-11 before it was passed were specifically requested by the Exchange Contractors related to Interim Flows and third party protections from such flows. Nowhere was it discussed that the Interim Flows should be, or needed to be, delayed during the development of these last additions to Public Law 111-11. Reclamation has worked diligently to comply with all of the provisions and protections in Public Law 111-11 and will continue to do so in the future.

In conclusion, I want to emphasize that Reclamation remains committed to working closely with all third party interests in the planning, design, and implementation of the Settlement and Public Law 111-11. A continued strong and cooperative relationship with the Exchange Contractors and your members is important to Reclamation and I believe it is critical to effectively implementing the

Settlement and addressing your concerns. I look forward to continuing to work with you as we move forward in implementing Reclamation's responsibilities under Public Law 111-11. If you have any questions, please contact me or Jason Phillips at 916-978-5456 or jphillips@usbr.gov.

Sincerely,

Pablo R. Arroyave

FOR Donald R. Glaser
Regional Director

cc: Honorable Dianne Feinstein
United States Senate
Washington, DC 20515

Honorable Barbara Boxer
United States Senate
Washington, DC 20515

Honorable George Radanovich
House of Representatives
Washington, DC 20515

Honorable Dennis Cardoza
House of Representatives
Washington, DC 20515

Honorable Jim Costa
House of Representatives
Washington, DC 20515

Mr. John Engbring
U.S. Fish & Wildlife Service
2800 Cottage Way, Ste. W-2606
Sacramento, CA 95825

Ms. Rhonda Reed
National Marine Fisheries Service
650 Capital Mall, Ste. 8-300
Sacramento, CA 95814

Dr. Jeffrey R. Single
California Department of Fish & Game
1234 E. Shaw Avenue
Fresno, CA 93710

Ms. Paula Landis
California Department of Water Resources
3374 East Shields Avenue
Fresno, CA 93726

Ms. Victoria Whitney
State Water Resources Control Board
P.O. Box 100
Sacramento, CA 95812

Ms. Kathy Mrowka
State Water Resources Control Board
P.O. Box 100
Sacramento, CA 95812

Continued on next page.

Continued from previous page.

Mr. Monty Schmitt
Natural Resources Defense Council
111 Sutter St., 20th Floor
San Francisco, CA 94104

Mr. Ronald Jacobsma
Friant Water Users Authority
854 North Harvard Avenue
Lindsay, CA 93247

Mr. James O'Banion
Central California Irrigation District
15775 S. Indiana
Dos Palos, CA 93620

Mr. Christopher White
Central California Irrigation District
P.O. Box 1231
Los Banos, CA 93635

Mr. James Nickel
San Luis Canal Company
P.O. Box 60679
Bakersfield, CA 93386

Mr. Chase Hurley
San Luis Canal Company
11704 W. Henry Miller Road
Dos Palos, CA 93620

Mr. Michael Stearns
Firebaugh Canal Water District
47375 W. Dakota
Firebaugh, CA 93622

Mr. Jeff Bryant
Firebaugh Canal Water District
P.O. Box 97
Mendota, CA 93640

Mr. Roy Catania
Columbia Canal Company
10302 Avenue 7 ½
Firebaugh, CA 93622

Mr. Randy Houk
Columbia Canal Company
6770 Avenue 7 ½
Firebaugh, CA 93622

Gasdick, Alicia E

From: Gasdick, Alicia E
Sent: Monday, November 09, 2009 10:45 AM
To: 'mikew@paramountfarming.com'
Cc: Deflitch, Douglas A (DDEFLITCH@usbr.gov); Phillips, Jason R
Subject: SJRRP Interim Flows Update

Mike,

Just a quick update on Interim Flows, the flow were just upstream of the Bifurcation Structure (~0.2 Miles) as of 0730 this morning. They will likely reach the Bifurcation Structure sometime in the next 24 hours and may reach San Mateo Ave in the next couple of days. We have a link to the real-time flow data for the Bifurcation Structure and Gravelly Ford on the Program website at: http://www.restoresjr.net/maps/SJRRarea_Map.html. We will keep you advised of the progress of flows as they move downstream of the Bifurcation Structure. Also, please be advised that under Order Water Right 2009-0058-DWR, Interim Flows are protected under the California Water Code and shall not be diverted or stored unless otherwise authorized by Reclamation consistent with the Order.

We look forward to seeing you at the landowner meeting next week.

Ali

Alicia Gasdick
San Joaquin River Restoration Program
Bureau of Reclamation
Phone: 916-978-5464
Mobile: 916-335-6960
agasdick@usbr.gov

Gasdick, Alicia E

From: Widhalm, Mike [mikew@paramountfarming.com]
Sent: Tuesday, November 10, 2009 9:15 AM
To: Gasdick, Alicia E
Cc: Deflitch, Douglas A; Phillips, Jason R; Brown, Kimberly; Catania, Roy
Subject: RE: SJRRP Interim Flows Update

Thanks for the update Ali.

Please be aware that Paramount does have riparian rights to flows in the River and has the right to divert this water. Due to the timing of this winter release we do not have irrigation needs to meet; however, we will reassess our needs come spring.

Best regards,

Mike

From: Gasdick, Alicia E [mailto:agasdick@usbr.gov]
Sent: Monday, November 09, 2009 10:45 AM
To: Widhalm, Mike
Cc: Deflitch, Douglas A; Phillips, Jason R
Subject: SJRRP Interim Flows Update

Mike,

Just a quick update on Interim Flows, the flow were just upstream of the Bifurcation Structure (~0.2 Miles) as of 0730 this morning. They will likely reach the Bifurcation Structure sometime in the next 24 hours and may reach San Mateo Ave in the next couple of days. We have a link to the real-time flow data for the Bifurcation Structure and Gravelly Ford on the Program website at: http://www.restoresjr.net/maps/SJRRarea_Map.html. We will keep you advised of the progress of flows as they move downstream of the Bifurcation Structure. Also, please be advised that under Order Water Right 2009-0058-DWR, Interim Flows are protected under the California Water Code and shall not be diverted or stored unless otherwise authorized by Reclamation consistent with the Order.

We look forward to seeing you at the landowner meeting next week.

Ali

Alicia Gasdick
San Joaquin River Restoration Program
Bureau of Reclamation
Phone: 916-978-5464
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United States Department of the Interior

BUREAU OF RECLAMATION
Mid-Pacific Regional Office
2800 Cottage Way
Sacramento, California 95825-1898

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IN REPLY REFER TO:

MP-170
PRJ-1.00

DEC 21 2009

Mr. Mike Widhalm
Paramount Farming Company
33141 E. Lerdo Highway
Bakersfield, CA 93308

Subject: San Joaquin River Restoration Program's Interim Flows

Dear Mr. Widhalm:

This letter is in response to your e-mail to Alicia Gasdick dated November 10, 2009, regarding Paramount Farms' riparian rights and the San Joaquin River Restoration Program's (SJRRP) Interim Flows Project. In your e-mail, you indicated that Paramount Farms has riparian rights to flows in the San Joaquin River and has a right to divert the SJRRP's Interim Flows. The Bureau of Reclamation hereby informs you that the Interim Flows are protected from diversion by Water Right Order 2009-0058-DWR (Order) issued by the State Water Resources Control Board (State Board), and that Paramount Farms may not divert these flows without violating this Order. In the event that Paramount Farms diverts the Interim Flows, Reclamation will be compelled to take appropriate enforcement actions to stop such diversions.

Paragraph 15 of the Settlement in *NRDC et al., v. Rodgers et al.* (Settlement) outlines a program of initial flow releases, termed Interim Flows, to begin no later than October 1, 2009. Under Paragraph 13(h) of the Settlement, Reclamation is required to manage and control all Interim Flows from Friant Dam to the Sacramento-San Joaquin Delta and undertake all reasonable measures to protect the rights to manage and control the Interim Flows, including initiating appropriate enforcement proceedings to prevent unlawful diversions of, interference with, or taking of Interim Flows. For this reason, Reclamation petitioned the State Board to protect the Interim Flow releases under California Water Code Section 1707. On October 1, 2009, the State Board issued its Order for the SJRRP's Water Year 2010 Interim Flows Project. The Order provides for a temporary transfer of water including adding points of use, places-of-use and purposes-of-use, and protects the flows from unauthorized diversions.

Your November 10, 2009, e-mail indicates to me that Paramount Farms believes it can divert or store Interim Flows under its riparian water right. Riparian water rights apply only to the water which would naturally flow in the stream. The Interim Flows are not abandoned, surplus, or natural flow waters, nor are they flood flows. Rather, Interim Flows are waters appropriated under Reclamation's appropriative water right permits that are stored in Millerton Reservoir and released by Reclamation for instream purposes and for rediversion at specific points outlined in our water right permits and in the Order. The Interim Flows are protected under the Order, Section 1707 of the California Water Code, and the Settlement from unauthorized storage or diversion. Since these Interim Flows are protected from diversion, Paramount Farms may not divert or store Interim Flows.

This letter solely addresses the topic of Paramount Farms' ability to divert the SJRRP's Interim Flows, and takes no position on your assertion that Paramount Farms has a riparian right to flows in the San Joaquin River. We appreciate your efforts in working with us to implement the Settlement and look forward to continuing to work closely with you in the future. Please contact me if you have any questions at, 916-978-5455 or jphillips@usbr.gov.

Sincerely,

Jason R. Phillips
Program Manager

cc: Ms. Kathy Mrowka
State Water Resources Control Board
P.O. Box 2000
Sacramento, CA 95812

Mr. Monty Schmitt
Natural Resources Defense Council
111 Sutter St., 20th Floor
San Francisco, CA 94104

Mr. Ronald Jacobsma
Friant Water Users Authority
854 North Harvard Avenue
Lindsay, CA 93247

United States Department of the Interior

BUREAU OF RECLAMATION
Mid-Pacific Regional Office
2800 Cottage Way
Sacramento, California 95825-1898

IN REPLY
REFER TO:

MP-170
PRJ-1.00

MAY 24 2010

Mr. George Park
Lone Tree Mutual Water Company
5002 W Newhall Rd
El Nido, CA 95317

Subject: San Joaquin River Restoration Program's Interim Flows

Dear Mr. Park:

This letter is in response to the San Joaquin River Restoration Program's (SJRRP) Interim Flows Project and observed flows in a diversion near the Sand Slough Control Structure. In the May 11, 2010 phone conversation with U.S. Bureau of Reclamation staff, you identified the diversion as operated by the Lone Tree Mutual Water Company (Water Company). You indicated that the Water Company has riparian rights to flows in the San Joaquin River and that the Water Company was diverting inflows from upstream sources. We request that you provide Reclamation with information on how natural flow is available to support the diverted quantities.

Paragraph 15 of the Settlement in *NRDC et al., v. Rodgers et al.* (Settlement) outlines a program of initial flow releases, termed Interim Flows, to begin no later than October 1, 2009. Under Paragraph 13(h) of the Settlement, Reclamation is required to manage and control all Interim Flows from Friant Dam to the Sacramento-San Joaquin Delta and undertake all reasonable measures to protect the rights to manage and control the Interim Flows, including initiating appropriate enforcement proceedings to prevent unlawful diversions of, interference with, or taking of Interim Flows. For this reason, Reclamation petitioned the State Water Resources Control Board (State Board) in order to protect the Interim Flow releases under California Water Code Section 1707. On October 1, 2009, the State Board issued Water Rights Order 2009-0058-DWR (Order) for the SJRRP's Water Year 2010 Interim Flows Project. The Order provides for a temporary transfer of water, adds points of rediversion, places-of-use and a purpose-of-use, and protects the flows from unauthorized diversions.

Interim Flows are waters stored under Reclamation's appropriative water right permits in Millerton Reservoir and released for instream purposes and for rediversion at specific points. The Interim Flows are foreign in time and not abandoned, surplus, or natural flow waters, nor are they flood flows. Riparian water rights apply only to the water which would naturally flow in the stream. Therefore, riparian water right holders do not have a right to divert the SJRRP's

Interim Flows. In the event that the Water Company is diverting the Interim Flows, Reclamation will be compelled to take appropriate enforcement actions to stop such diversions.

We appreciate your efforts in working with us to implement the Settlement and look forward to continuing to work closely with you in the future. We would appreciate your response within two weeks regarding how natural flow is available to support your diversion quantities. Please contact me if you have any questions at, 916-978-5455 or jphillips@usbr.gov.

Sincerely,

Jason R. Phillips
Program Manager

cc: Ms. Kathy Mrowka
State Water Resources Control Board
P.O. Box 2000
Sacramento, CA 95812

Mr. Monty Schmitt
Natural Resources Defense Council
111 Sutter St., 20th Floor
San Francisco, CA 94104

Mr. Ronald Jacobsma
Friant Water Users Authority
854 North Harvard Avenue
Lindsay, CA 93247

LONE TREE MUTUAL WATER COMPANY
5002 W. El Nido Road
El Nido, CA 95317
Telephone (209) 722-3997
Facsimile (209) 722-0373

June 9, 2010

Mr. Jason Phillips
United States Department of the Interior
Bureau of Reclamation
2800 Cottage Way
Sacramento, CA 95825-1898

Re: May 24, 2010 correspondence regarding diversions

Dear Mr. Phillips:

I am responding to your May 24, 1010 inquiry regarding riparian diversions by the Lone Tree Mutual Water Company ("Lone Tree").

Lone Tree services approximately 14,000 acres, all of which was formerly owned by The Newhall Land and Farming Company. Lone Tree was formed when Newhall sold that property. Most of that land held riparian rights in Newhall's holding, and when the property was sold those rights were expressly reserved in the relevant deeds. It is relevant that those rights have been acknowledged by the United States in the past. By recorded instrument, Lone Tree was named as the landowners' agent to exercise those rights. Just as Newhall and its predecessors did for most of a century, Lone Tree has historically exercised those riparian rights for its riparian landowners when flows (typically flood flows) appeared at its diversion facilities.

Lone Tree understands Reclamation's position relative to San Joaquin River restoration flows and does not wish to interfere with the restoration program. However, it is worth noting that flood water used for restoration purposes is water Lone Tree has historically diverted, and its use for restoration deprives Lone Tree and its members of waters to which they are entitled.

Relative to your specific question, during the period of Lone Tree's diversion in 2010 there were flows other those earmarked for restoration in the river. For example, on May 11, 2010, Lone Tree's river diversions were less than 14 cubic feet per second; on that same day, flows from Cottonwood Creek and Little Dry Creek – which are tributaries to the San Joaquin River that enter below the Friant Dam – were substantially in excess of that flow. Other water (such as operational return flows and local runoff) were also present in the river during Lone Tree's diversions.

We may disagree over whether Lone Tree has a right to flood flows designated as restoration flows, and over whether Reclamation would deprive Lone Tree and its landowners of a vested right by limiting our access to those flows. However, there should be no disagreement that Lone Tree has the right, on behalf of its landowners, to divert flows other than restoration flows (such as flood releases not earmarked for restoration, return flows and operational spills). Any other position would be inconsistent with the guiding principle of the restoration program that third parties are not to be adversely affected.

If Reclamation disagrees, we should meet as soon as possible, as landowners within the Lone Tree service area will be significantly damaged if water they have relied upon and used for decades is suddenly unavailable to them.

Sincerely,

George Park

George Park
Manager
Lone Tree Mutual Water Company

Email: lonetreh2o@gmail.com

cc: Gary W. Sawyers
Sawyers & Holland, LLP
652 West Cromwell Avenue, Suite 101
Fresno, CA 93711

Attachment 9:

The WY 2010 Interim Flows Project Biological Assessment (BA), BA Transmittal Letters, FWS and NMFS Concurrence Letters

SAN JOAQUIN RIVER
RESTORATION PROGRAM

Water Year 2010 Interim Flows Project

Biological Assessment

May 22, 2009

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List of Abbreviations and Acronyms

°F	degrees Fahrenheit
Act	San Joaquin River Restoration Settlement Act
AFRP	Anadromous Fish Restoration Program
BA	Biological Assessment
Banks	CVP – Harvey O. Banks Pumping Plant
BNLL	blunt-nosed leopard lizard
BO	biological opinion
CCID	Central California Irrigation District
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
COA	Coordinated Operation of the CVP and SWP
CVP	Central Valley Project
CWA	Clean Water Act
D-1485	SWRCB Decision 1485
DCC	Delta Cross Channel
Delta	Sacramento-San Joaquin Delta
DMC	Delta-Mendota Canal
DO	dissolved oxygen
DPS	distinct population segment
DWR	California Department of Water Resources
DWSC	Deep Water Ship Channel
ECPWG	Environmental Compliance Permitting and Work Group
EFH	essential fish habitat
ESA	Endangered Species Act
ESU	evolutionarily significant unit
FMWG	Fisheries Management Work Group
FR	Federal Register
HCP	habitat conservation plans
IWM	instream woody material
Jones	SWP – C. W. “Bill” Jones Pumping Plant
LSZ	low-salinity zone
NMFS	National Marine Fisheries Service
NRDC	Natural Resources Defense Council

NWR	National Wildlife Refuge
PCB	polychlorinated biphenyl
PCE	Primary Constituent Element
PFMC	Pacific Fishery Management Council
ppt	parts per thousand
RA	Restoration Administrator
RBDD	Red Bluff Diversion Dam
Reclamation	U.S. Department of the Interior, Bureau of Reclamation
RPA	Reasonable and prudent Alternative
RWQCB	Regional Water Quality Control Boards
SJRRP	San Joaquin River Restoration Program
SJVAPCD	San Joaquin Valley Air Pollution Control District
SLDMWA	San Luis Delta Mendota Water Authority
SWP	State Water Project
SWRCB	California State Water Resources Control Board
USACE	United States Army Corps of Engineers
USC	U.S. Code
USFWS	U.S. Fish and Wildlife Service
VAMP	Vernalis Adaptive Management Program
WRPC	Watershed Restoration and Protection Council
WY 2010	Water Year 2010
YOY	young-of-the-year

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1.0 Introduction

The San Joaquin River Restoration Program (SJRRP) was established in late 2006 to implement the Stipulation of Settlement in *NRDC et al. v. Kirk Rodgers et al.* (Settlement). Authorization for implementing the Settlement is provided in the San Joaquin River Restoration Settlement Act (Act: Public Law 111-11). The U.S. Department of the Interior, Bureau of Reclamation (Reclamation), as the Federal lead agency is preparing this Biological Assessment in compliance with Section 7 of the Federal Endangered Species Act.

1.1 Project Summary

Reclamation is proposing to temporarily change Friant Dam operations in Water Year 2010 (WY 2010) (October 1, 2009, through September 30, 2010) to release WY 2010 Interim Flows from Friant Dam into the San Joaquin River and potentially downstream as far as the Sacramento-San Joaquin Delta (Delta), as specified in the Act, and reoperation of Friant Dam is part of the SJRRP established under the Settlement. A portion or all of the WY 2010 Interim Flows would be recaptured by existing water diversion facilities along the San Joaquin River and/or in the Delta for agricultural, municipal and industrial, and/or fish and wildlife uses. Potential diversion locations for recapturing releases of Interim Flows during WY 2010 are Mendota Pool, Arroyo Canal, the Lone Tree Unit of the Merced National Wildlife Refuge (NWR), the East Bear Creek Unit of the San Luis NWR Complex, and Central Valley Project (CVP) and State Water Project (SWP) Delta export facilities. The action would involve no construction activities.

The purpose of the Proposed Action is to implement the provisions of the Settlement pertaining to WY 2010. The need for action is specified in the Settlement, which requires Interim Flows to be released in WY 2010. The action is needed to support collection of relevant data to guide future releases of Interim Flows and Restoration Flows under the SJRRP. Other environmental conservation measures to avoid adverse effects on suitable habitat for the listed plant and wildlife species potentially affected by the Proposed Action (e.g., managing nonnative vegetation, avoiding sensitive habitats, and conducting focused surveys) are also proposed by Reclamation as part of the WY 2010 Interim Flows.

1.2 Purpose

The purpose of this Biological Assessment (BA) is to review the WY 2010 Interim Flows in detail sufficient to determine the extent to which implementing the Proposed Action may affect any Federally listed or proposed for listing as threatened or endangered species under the jurisdiction of the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS). This BA has been prepared in accordance with requirements set forth under Section 7 of the Federal Endangered Species Act (ESA) (16 U.S. Code (USC) 1536(c)), described below.

1.2.1 Regulatory Framework

Under provisions of Section 7(a)(2) of the ESA, a Federal agency that permits, licenses, funds, or otherwise authorizes activities must consult with USFWS and NMFS, as appropriate, to ensure that its action will not jeopardize the continued existence of any listed species or adversely modify critical habitat (16 USC 1536(c)). A Federal agency is required to consult if an action “may affect” listed species or designated critical habitat. The term “biological assessment” refers to the information prepared by, or under the direction of, the Federal agency concerning listed and proposed species and designated and proposed critical habitat that may be present in the Action Area, and the evaluation of the potential effects of the action on those species and habitat (50 Code of Federal Regulations (CFR) Section 402.2). A BA must be prepared if listed species or critical habitat may be present in an area to be affected by a “major construction activity.” When a Federal agency determines, through a BA or other review, that its action is “likely to adversely affect” a listed species or designated critical habitat, the agency must submit a request for formal consultation to USFWS and NMFS if the Federal action would adversely affect listed anadromous fish species. There is a designated period of time (90 days) for this consultation to take place and, after that, another set period of time (45 days) for USFWS and NMFS to prepare Biological Opinions (BO). The BOs present USFWS’s and NMFS’s determinations as to whether or not the Proposed Action would be likely jeopardize the species or adversely modify its critical habitat. If a “jeopardy” or “adverse modification” determination is made, the BO must identify any reasonable and prudent alternative actions that could satisfy the purpose and need for the action.

If USFWS and NMFS issue either a “nonjeopardy” opinion or a “jeopardy” opinion that contains reasonable and prudent alternatives, the opinion may include an incidental take statement. USFWS and NMFS must anticipate the quantity of take that may result from the Proposed Action and authorize such take with a statement that the listed species described in the incidental take statement will not be jeopardized. The incidental take statement must contain clear terms and conditions designed to reduce the impact of the anticipated take; these terms are binding on the action agency.

In addition to compliance with ESA, Reclamation is required to comply with the Magnuson-Stevens Fishery Conservation and Management Act. The purpose of this act is for Federal agencies to take immediate action to conserve and manage the fishery resources found off the coasts of the United States, and the nation’s anadromous species and continental shelf fishery resources. Consultation with NMFS is required when any action authorized, funded, or undertaken, or proposed to be authorized, funded, or undertaken, may adversely affect any essential fish habitat (EFH). Within the Action Area, EFH is found only in the Delta and in the three main San Joaquin River tributaries (Merced, Tuolumne and Merced rivers). This BA incorporates an assessment of EFH to provide NMFS with the opportunity to include an EFH determination in the BO.

1.2.2 Proposed Action

The Proposed Action is to increase the release of water from Friant Dam for one year (WY 2010) in accordance with the Settlement and in a manner consistent with Federal, State, and, local laws, and future agreements with downstream agencies, entities, and landowners. The activities, and the related environmental commitment measures, of the Proposed Action are described in Chapter 3 of this BA. The Proposed Action would release Interim Flows to the San Joaquin River from Friant Dam during WY 2010, from October 1, 2009, through November 20, 2009, and from February 1, 2010, through September 30, 2010, in accordance with the flow schedule presented in Exhibit B of the Settlement. WY 2010 Interim Flows would be reduced or diverted as needed to avoid causing substantial adverse conditions in downstream reaches, as specified in environmental commitments. The Proposed Action involves recapturing WY 2010 Interim Flows at locations along the San Joaquin River, in the Delta, or both to the maximum extent possible, and transferring this water back to the Friant Division Long-Term Contractors. The maximum downstream extent of WY 2010 Interim Flows that could be recaptured would be at the CVP Harvey O. Banks Pumping Plant (Banks) and the SWP C. W. "Bill" Jones Pumping Plant (Jones) in the Delta.

This BA analyzes direct, indirect, interrelated/interdependent, and cumulative effects of Reclamation's Proposed Action on Federally proposed and listed species considered in the assessment. This BA will be used by USFWS and NMFS to analyze the Proposed Action for Section 7 consultation on the WY 2010 Interim Flows.

1.3 Action Area

The Action Area is defined as all areas to be affected directly or indirectly by the Federal action, not strictly the immediate area involved in the action (USFWS and NMFS 1998). The Action Area includes all areas where flows and water levels could be altered as a result of the release of WY 2010 Interim Flows under the SJRRP (see Figure 1-1, "Action Area"). Specifically, the Action Area covers the following areas:

- Millerton Lake and the San Joaquin River between Kerkhoff Dam and Millerton Lake
- San Joaquin River from Friant Dam downstream to the Delta
- Eastside Bypass, downstream from the Sand Slough Control Structure, and the Mariposa Bypass
- Merced, Tuolumne, and Stanislaus rivers downstream from New Exchequer, Don Pedro, and New Melones dams, respectively
- South and central Delta, defined as the San Joaquin River and its tributaries within the Delta west to its confluence with the Sacramento River

1.4 Species Evaluated

This document evaluates threatened, endangered, proposed threatened, or proposed endangered species under the jurisdiction of USFWS and NMFS that have potential to be affected by the Proposed Action, as well as any designated or proposed critical habitat. A preliminary list of species for consideration was requested from NMFS (Appendix A) and compiled from official species lists maintained and USFWS (Appendix B) that encompass the Action Area.

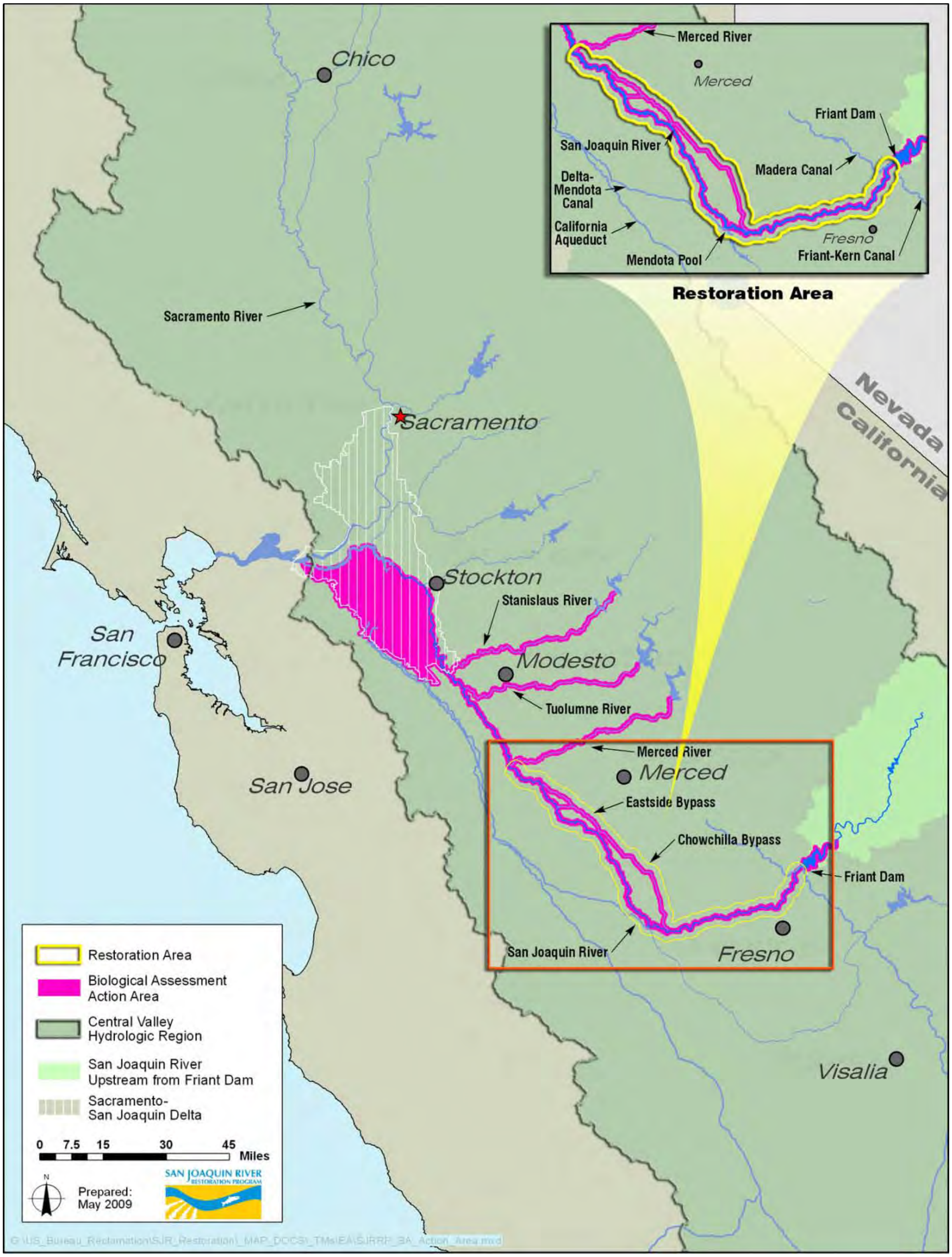


Figure 1-1.
Action Area for the Water Year 2010 Interim Flows

1.4.1 Species Included in the Analysis

Tables 1-1, 1-2, and 1-3 identify the Federally listed fish, plant, and wildlife species that are addressed in this BA.

Table 1-1.
Federally Listed Fish Species That May be Affected by WY 2010 Interim Flows

Species	Federal Status	Critical Habitat
North American green sturgeon *Acipenser medirostris*	T	Proposed critical habitat in the Action Area (73 *Federal Register* 52084–52110, September 8, 2008).
Delta smelt *Hypomesus transpacificus*	T	Designated critical habitat in the Action Area (59 *Federal Register* 65256–65279, December 19, 1994).
Central Valley steelhead distinct population segment (DPS) *Oncorhynchus mykiss*	T	Designated critical habitat in the Action Area (70 *Federal Register* 52488–52536, September 2, 2005).
Central Valley spring-run Chinook salmon evolutionarily significant unit (ESU) *Oncorhynchus tshawytscha*	T	Designated critical habitat not within the Action Area (70 *Federal Register* 52488–52536, September 2, 2005).
Sacramento River winter-run Chinook salmon ESU *Oncorhynchus tshawytscha*	E	Designated critical habitat not within the Action Area (58 *Federal Register* 33212–33219, June 16, 1993).

Notes:
U.S. Fish and Wildlife Service Federal and National Marine Fisheries Service Listing Categories:
E = Federally listed as endangered
T = Federally listed as threatened

Table 1-2.
Federally Listed Plant Species That May be Affected by WY 2010 Interim Flows

Species	Federal Status	Critical Habitat	Habitat Association
Succulent owl's-clover *Castilleja campestris* ssp. *succulenta*	T	Designated critical habitat in the Action Area (70 *Federal Register* 46924–46999).	Northern claypan and northern hardpan vernal pools on alluvial terraces or northern basalt flow vernal pools, often acidic soils; 160–2,500 feet elevation.
Hoover's spurge *Chamaesyce hooveri*	T	Designated critical habitat in the Action Area (70 *Federal Register* 46924–46999).	Relatively deep, northern hardpan and northern claypan vernal pools on alluvial fans or terraces of ancient rivers or streams; neutral to saline-alkaline soils over lime-silica cemented hardpan or claypan in the San Joaquin Valley or acidic soils over iron-silica cemented hardpan in the Sacramento Valley; usually in areas devoid of competing vegetation; 80–820 feet elevation.
Palmate-bracted bird's-beak *Cordylanthus palmatus*	E	None designated.	Alkaline soils in chenopod scrub and valley and foothill grassland; 15–500 feet elevation.
Colusa grass *Neostapfia colusana*	T	Designated critical habitat in the Action Area (70 *Federal Register* 46924–46999, August 11, 2005).	Large, relatively deep northern claypan and northern hardpan vernal pools on the rim of alkaline basins or acidic soils of alluvial fans and stream terraces; lime-silica cemented hardpan in the San Joaquin Valley basins to iron-silica cemented hardpan in eastern margin of the San Joaquin Valley; 15–4,000 feet elevation.
San Joaquin Valley Orcutt grass *Orcuttia inaequalis*	T	Designated critical habitat adjacent to the Action Area (70 *Federal Register* 46924–46999, August 11, 2005).	Northern claypan, northern hardpan, and northern basalt flow vernal pools on alluvial fans, high and low stream terraces, and tabletop lava flows; acidic soils over iron-silica cemented hardpan, tuffaceous alluvium, and basaltic rock from ancient volcanic flows; 30–2,500 feet elevation
Hairy Orcutt grass *Orcuttia pilosa*	E	Designated critical habitat in the Action Area (70 *Federal Register* 46924–46999, August 11, 2005).	Northern hardpan and northern claypan vernal pools on high or low stream terraces and alluvial fans; found on both acidic and saline-alkaline soils with iron-silica cemented hardpan or claypan; 175–650 feet elevation.
Greene's tuctoria *Tuctoria greenei*	E	Designated critical habitat in the Action Area (70 *Federal Register* 46924–46999, August 11, 2005).	Northern basalt flow, northern claypan, and northern hardpan vernal pools underlain by iron-silica cemented hardpan, tuffaceous alluvium, or claypan; 110–3,500 feet elevation.

Source: USFWS 2009
Notes:
U.S. Fish and Wildlife Service Federal Listing Categories:
E = Federally listed as endangered
T = Federally listed as threatened

Table 1-3.
Federally Listed Wildlife Species That May be Affected by WY 2010 Interim Flows

Common Name	Federal Status	Critical Habitat	Habitat Association
Invertebrates			
Conservancy fairy shrimp *Branchinecta conservatio*	E	Designated critical habitat in the Action Area (70 *Federal Register* 46924–46999, August 11, 2005).	Vernal pools and swales.
Longhorn fairy shrimp *Branchinecta longiantenna*	E	Designated critical habitat in the Action Area (70 *Federal Register* 46924–46999, August 11, 2005).	Vernal pools and swales.
Vernal pool fairy shrimp *Branchinecta lynchi*	T	Designated critical habitat in the Action Area (70 *Federal Register* 46924–46999, August 11, 2005).	Vernal pools and other seasonal wetlands.
Valley elderberry longhorn beetle *Desmocerus californicus dimorphus*	T	No designated critical habitat in the Action Area (45 *Federal Register* 52803–52807, August 10, 1980).	Elderberry shrubs, typically in riparian habitats.
Vernal pool tadpole shrimp *Lepidurus packardi*	E	Designated critical habitat in the Action Area (70 *Federal Register* 46924–46999, August 11, 2005).	Vernal pools, swales, and other ephemeral wetlands.
Amphibians			
California tiger salamander *Ambystoma californiense*	T	Designated critical habitat in the Action Area (70 *Federal Register* 49379–49458, August 23, 2005).	Small ponds, lakes, or vernal pools in grasslands or oak woodlands.
Reptiles			
Blunt-nosed leopard lizard *Gambelia sila*	E	None designated.	Open habitats with scattered low bushes on alkali flats, plains, washes, and arroyos.
Giant garter snake *Thamnophis gigas*	T	None designated.	Streams, sloughs, ponds, and irrigation/drainage ditches; also requires upland refugia not subject to flooding during its inactive season.

Table 1-3.
Federally Listed Wildlife Species That May be Affected by WY 2010 Interim Flows (contd.)

Common Name	Federal Status	Critical Habitat	Habitat Association
Birds			
Western yellow-billed cuckoo *Coccyzus americanus occidentalis*	C	None designated.	Inhabits wide, dense riparian forests with a thick understory of willows for nesting; prefers sites with a dominant cottonwood overstory for foraging.
Least Bell's vireo *Vireo bellii pusillus*	E	No designated critical habitat in the Action Area (59 *Federal Register* 4845–4867, February 2, 1994).	Cottonwood-willow forest, oak woodland, shrubby thickets, and dry washes with willow thickets.
Mammals			
Fresno kangaroo rat *Dipodomys nitratoides exilis*	E	No designated critical habitat in the Action Area (50 *Federal Register* 4222–4226, January 30, 1985).	Alkali desert scrub habitats between 200 and 300 feet elevation.
San Joaquin (riparian) woodrat *Neotoma fuscipes riparia*	E	None designated.	Riparian forests.
Riparian brush rabbit *Sylvilagus bachmani riparius*	E	None designated.	Dense thickets of brush associated with riparian or chaparral habitats.
San Joaquin kit fox *Vulpes macrotis mutica*	E	None designated.	Saltbush scrub, grasslands, oak savannas, and freshwater scrub.

Source: USFWS 2009

Notes:
U.S. Fish and Wildlife Service Federal Listing Categories:
C = Candidate for listing
E = Federally listed as endangered
T = Federally listed as threatened

1.4.2 Species Eliminated from the Analysis

Certain species on the preliminary list were eliminated from further consideration either because suitable habitat for the species or the species itself is not present in the area that could be affected by implementing the Proposed Action. Table 1-4 lists the Federally listed species identified on NMFS and USFWS species lists that would not be affected by the Proposed Action and provides supporting rationale for eliminating each species from the analysis.

Table 1-4.
Federally Listed Fish, Plant, and Wildlife Species Not Affected by WY 2010 Interim Flows

Species	Federal Status	Critical Habitat	Habitat Association	Potential for Occurrence
Fish Species				
Central California Coast Steelhead *Oncorhynchus mykiss*	T	No designated critical habitat in the Action Area (70 Federal Register 52488—52536, September 2, 2005).	Drainages of San Francisco, San Pablo, and Suisun bays eastward to Chipps Island at confluence of the Sacramento and San Joaquin rivers.	Unlikely; the Action Area does not overlap the range of the species.
Plant Species				
Chinese Camp brodiaea *Brodiaea pallida*	T	None designated.	Seeps and springs in serpentinite or volcanic soils; 1,200 feet elevation.	Unlikely; this species is known from only two occurrences, both near Chinese Camp and outside the Action Area (north of Don Pedro Reservoir).
California jewelflower *Caulanthus californicus*	E	None designated.	Saline-alkaline soils in shadscale scrub, valley and foothill grassland, pinyon-juniper woodland, 0–3,000 feet elevation.	Unlikely; the only known occurrence in the vicinity has been extirpated and the only known extant occurrences are in Santa Barbara Canyon, the Carrizo Plain, and the Kreyenhagen Hills of the Mt. Diablo Range.
Soft bird's-beak *Cordylanthus mollis* ssp. *mollis*	E	No designated critical habitat in the Action Area (72 *Federal Register* 18518–18553, April 12, 2007).	Saltgrass-pickleweed marshes at or near the limits of tidal action; 0–10 feet elevation.	Unlikely; this species' current distribution is restricted to San Pablo and Suisun bays, and it has been extirpated from the Delta.
Contra Costa wallflower *Erysimum capitatum* ssp. *angustatum*	E	No designated critical habitat in the Action Area (43 *Federal Register* 39042–39044, August 31, 1978).	Inland sand dunes; 10–65 feet elevation.	Unlikely; this species is known from only three occurrences at the Antioch Dunes. The dunes are hydrologically isolated from the San Joaquin River and flood flows would not be altered in the dunes.

Table 1-4.
Federally Listed Fish, Plant, and Wildlife Species Not Affected by WY 2010 Interim Flows (contd.)

Species	Federal Status	Critical Habitat	Habitat Association	Potential for Occurrence
Plant Species (contd.)				
Contra Costa goldfields *Lasthenia conjugens*	E	No designated critical habitat in the Action Area (70 *Federal Register* 46923–46999, August 11, 2005).	Northern basalt flow, northern claypan, and northern volcanic ashflow vernal pools, swales, and moist flats; historic occurrences in saline-alkaline transition zone between vernal pool and tidal marsh habitat; known from 5 to 1,400 feet elevation, but most are between 5 and 200 feet elevation.	Unlikely; there are no known extant occurrences in the vicinity of the Action Area.
San Joaquin woollythreads *Monolopia congdonii*	E	None designated.	Alkali sinks and valley and foothill grassland with sandy soils; 200–2,650 feet elevation.	Unlikely; historic record of this species in the Tranquility quadrangle, but this record is several miles from the river and possibly extirpated (last seen in 1935).
Antioch Dunes evening-primrose *Oenothera deltoides* ssp. *howellii*	E	No designated critical habitat in the Action Area (43 *Federal Register* 39042–39044, August 31, 1978).	Inland sand dunes; 10–100 feet elevation.	Unlikely; known from only three native occurrences at the Antioch Dunes. The dunes are hydrologically isolated from the San Joaquin River and flood flows would not be altered in the dunes.
Hartweg's golden sunburst *Psuedobahia bahiafolia*	E	None designated.	Cismontane and valley and foothill grassland with shallow, well-drained sandy loam soils, with mima mound topography; 50–500 feet elevation.	Unlikely; this species occurs in upland habitats far above the river channel and no suitable habitat is present in the Action Area.
Red Hills (California) vervain *Verbena californica*	T	None designated.	Serpentine soils in mesic areas along intermittent or perennial streams, often in overflow channels; 850–1,150 feet elevation.	Unlikely; known only from the Red Hills area of Tuolumne County. No suitable habitat is present in the Action Area.

Table 1-4.
Federally Listed Fish, Plant, and Wildlife Species Not Affected by WY 2010 Interim Flows (contd.)

Species	Federal Status	Critical Habitat	Habitat Association	Potential for Occurrence
Wildlife Species				
Lange's metalmark butterfly *Apodemia mormo langei*	E	None designated.	Sand dunes where the larval food plant, naked-stem buckwheat (*Eriogonum nudum* ssp. *auriculatum*) is present.	Unlikely to occur in the Action Area. Historically restricted to sand dunes along the south bank of the Sacramento and San Joaquin rivers, and is currently found only at the Antioch Dunes in Contra Costa County.
Delta green ground beetle *Elaphrus viridis*	T	No designated critical habitat in the Action Area (45 *Federal Register* 52807–52810, August 8, 1980).	Vernal pool grasslands.	Unlikely to occur in the Action Area. Only known to occur in the greater Jepson Prairie area in south-central Solano County.
California red-legged frog *Rana aurora draytonii*	T	No designated (71 *Federal Register* 19244–19346, April 13, 2006) or proposed revised designated critical habitat in the Action Area (73 *Federal Register* 53492–53680, September 16, 2008).	Aquatic habitats, such as creeks, streams, and ponds.	Unlikely to occur in the San Joaquin, Merced, Stanislaus, and Tuolumne rivers; no longer occurs on the floor of the Central Valley and rare within the foothills.
California clapper rail *Rallus longirostris obsoletus*	E	None designated.	Salt and brackish marshes of the San Francisco Bay estuary.	Not expected to be affected by the Proposed Action. Interim Flow effects in the Delta are expected to be so minimal that changes in vegetation communities are not likely to occur.
Giant kangaroo rat *Dipodomys ingens*	E	None designated.	Annual grasslands and shrubland habitats with sparse vegetative cover	Unlikely to occur in the Action Area although historically known from the region; now known to occur only in the Kettleman Hills in Kings County and western Kern County

Table 1-4.
Federally Listed Fish, Plant, and Wildlife Species Not Affected by WY 2010 Interim Flows (contd.)

Species	Federal Status	Critical Habitat	Habitat Association	Potential for Occurrence
Wildlife Species (contd.)				
Salt marsh harvest mouse *Reithrodontomys raviventris*	E	None designated.	Saline emergent wetlands of San Francisco Bay and its tributaries.	Not expected to be affected by the Proposed Action. Effects in the Delta of Interim Flows are expected to be so minimal that changes in vegetation communities are not likely to occur.

Source: USFWS 2009
Notes:
U.S. Fish and Wildlife Service Federal Listing Categories:
E = Federally listed as endangered
T = Federally listed as threatened

1.5 Critical Habitat

Critical habitat is defined in Section 3(5)A of the ESA as the specific areas within the geographical area occupied by the species on which are found physical or biological features essential to the conservation of the species and that may require special management considerations or protection (15 USC 1632A). Specific areas outside of the geographical area occupied by the species may also be included in designations of critical habitat, upon a determination that such areas are essential for the conservation of the species.

NMFS has identified several “Primary Constituent Elements” (PCE) which are essential to the conservation of the species. These PCEs include criteria to protect freshwater spawning and rearing sites and migration corridors; estuarine areas; and nearshore and offshore marine areas. Under the jurisdiction of NMFS, the Proposed Action (WY 2010 Interim Flows) addressed in this BA may adversely modify designated critical habitat for Central Valley steelhead and proposed critical habitat for the Southern DPS of the North American green sturgeon.

The Proposed Action addressed in this BA may adversely modify critical habitat for the following species under USFWS’s jurisdiction: delta smelt, succulent owl’s-clover, Hoover’s spurge, Colusa grass, hairy Orcutt grass, Greene’s tuctoria, Conservancy fairy shrimp, longhorn fairy shrimp, vernal pool fairy shrimp, vernal pool tadpole shrimp, and California tiger salamander.

1.6 Essential Fish Habitat

The Magnuson-Stevens Fishery Conservation and Management Act require Federal agencies to consult with NMFS on any activity that they fund, permit, or carry out that may adversely affect EFH. The EFH regulations require Federal agencies obligated to consult on EFH to also provide NMFS with a written assessment of the effects of their actions on EFH (50 CFR 600.920). NMFS is required to provide EFH conservation and enhancement recommendations to the Federal agencies. The statute also requires Federal agencies that receive NMFS conservation recommendations on EFH to provide a detailed written response to NMFS within 30 days from receipt. The Federal agency's response must detail how the agency intends to avoid, mitigate, or offset the effect of the activity on EFH (Section 305(b)(4)(B)). This BA includes evaluation of EFH for Pacific salmon and Pacific coast groundfish.

2.0 Consultation to Date

Table 2-1 lists, in chronological order, the consultations held to date between Reclamation and USFWS and/or NMFS for the WY 2010 Interim Flows. Major discussion topics, including important guidance or key decisions, are summarized. Consultation generally has been regular and ongoing for more than 1 year, primarily as part of the Environmental Compliance Permitting and Work Group (ECPWG), which includes staff from all Implementing Agencies, including Reclamation, USFWS, and NMFS. In addition, members of the Fisheries Management Work Group (FMWG) also including staff from the Implementing Agencies were involved in stages of the consultation process. ESA compliance for the WY 2010 Interim Flows and the SJRRP as a whole has been discussed on a regular basis as summarized in Table 2-1. The ECPWG and FMWG members continue to meet regularly to discuss ESA issues.

Table 2-1.
Endangered Species Act Consultation Conducted for the SJRRP

Date	Meeting	USFWS Personnel Present	NMFS Personnel Present	Important Decisions/Guidance Given/General Discussion
March 25, 2008	ECPWG meeting	Mark Littlefield	None	Mark Littlefield will seek input from his staff regarding the specific areas in which surveys will need to be completed for specific species before releasing Interim Flows.
April 8, 2008	ECPWG meeting	Mark Littlefield	None	The group discussed the differences in surveys needed to permit Interim and Restoration Flows versus those needed to permit the entire program.
June 10, 2008	ECPWG meeting	Mark Littlefield	None	It was discussed that Interim Flows in WY 2010 might require minimal species/habitat surveys, including surveys for the California tiger salamander. The group is assuming that Interim Flows will not use Reach 4B1.
July 23, 2008	ECPWG meeting	Mark Littlefield	None	The current Interim Flows description includes flows from October 2009 through September 2010, going to Mendota Pool to be recovered by the Exchange Contractors. Interim Flows beyond 2010 will be covered through the PEIS/R.

Table 2-1.
Endangered Species Act Consultation Conducted for the SJRRP (contd.)

Date	Meeting	USFWS Personnel Present	NMFS Personnel Present	Important Decisions/Guidance Given/General Discussion
July 29, 2008	ESA/ CESA meeting	Mark Littlefield and Maryann Owens	None	Some changes have occurred to the 2009–2010 Interim Flows project as a result of discussions with SWRCB. Reclamation needs to apply for temporary change permit with SWRCB. Interim flows would be for the period between October 1, 2009, and September 30, 2010. Interim Flow releases are not expected to reach Mendota Pool. Reclamation's water rights do not include fish and wildlife habitat, so the purpose of use identified in the rights would need to be changed under Water Code Section 1705 to accommodate this use. It was discussed how more water in Reaches 1 and 2 related to the Interim Flows could affect listed species in Mendota Pool. Giant garter snake may be an issue, but the addition of more water may be beneficial to the species. Maryann Owens inquired about giant garter snake surveys completed approximately 5 years ago. Julie Vance (DFG) will follow up about the availability of these data. The historical occurrence of bank swallow in Mendota Pool is likely not an issue, because habitat has been altered and is no longer suitable for nesting. A question about what the maximum flows were for the pilot study. (They were estimated to be between 600 and 1,000 cubic feet per second.) The pilot study received concurrence from USFWS that there would not likely be an adverse effect on Federally listed species. In addition, no take of State-listed species would occur. Julie Vance (DFG) and Maryann Owens (USFWS) think that a similar conclusion may be appropriate for the Interim Flows project, but they need to discuss with John Beam (DFG) the potential water level effects in Mendota Pool before making a determination.
October 28, 2008	ECPWG meeting	Mark Littlefield and Stephanie Rickabaugh	None	The group discussed the potential to send Interim Flows in WY 2010 through the Eastside Bypass to the Delta. The compliance associated with this action is expected to require an EIS/R, which would be difficult to complete in the allotted time frame, particularly considering the additional endangered species thought to be present in the bypass (e.g., button celery). Combined with uncertainty on the authority to use the bypass, the group recommends restricting Interim Flows to Mendota Pool.

Table 2-1.
Endangered Species Act Consultation Conducted for the SJRRP (contd.)

Date	Meeting	USFWS Personnel Present	NMFS Personnel Present	Important Decisions/Guidance Given/General Discussion
November 4, 2008	ECPWG meeting	Mark Littlefield	None	The team discussed the state of WY 2010 Interim Flows project description. The group discussed the location of potential habitat for blunt-nosed leopard lizard in Reach 2B because it relates to potential levee setbacks in this reach.
November 18, 2008	ECPWG meeting	Stephanie Rickabaugh	None	The group agreed that if Interim Flows would be delivered to the Delta, the action would no longer be exempt from CEQA and could require an EIS/R, as well as a BO and would therefore take enough time to affect the schedule. Therefore, Interim Flows should not be delivered past the Merced River confluence. The group agreed to include two flow delivery points (wildlife refuges in Reach 5, Mendota Pool) in the EA to ensure coverage for environmental review and permitting.
December 2, 2008	ECPWG meeting	Stephanie Rickabaugh	None	Interim Flows were discussed generally.
December 16, 2008	ECPWG meeting	Stephanie Rickabaugh	None	The WY 2010 Interim Flows project description is nearing completion and will be ready for review soon. The current description includes sending flows to the wildlife refuges upstream from the Merced River confluence.
January 6, 2009	ECPWG meeting	Stephanie Rickabaugh	None	Interim Flows were discussed generally.
January 20, 2009	ECPWG meeting	Stephanie Rickabaugh		Stephanie Rickabaugh requested spatial inundation information on the WY 2010 Interim Flows, which MWH will provide from MEI. This information will allow a better understanding of the potential to affect special-status species.
February 3, 2009	ECPWG meeting	Stephanie Rickabaugh	None	Because of potential issues with giant garter snake habitat in the backwater area of Mendota Pool, more discussion is needed in the EA on the potential changes in stage operations at Mendota Pool. Reclamation will look into operations at Mendota Pool to determine whether there is potential active storage available that could result in backwater stage changes. Because of the potential that blunt-nosed leopard lizard habitat exists in the Eastside Bypass, Stephanie Rickabaugh requested better information on the potential inundation at Interim Flow levels. Stephanie stated that a finding of not likely to adversely affect blunt-nosed leopard lizard would require informal consultation with USFWS.

Table 2-1.
Endangered Species Act Consultation Conducted for the SJRRP (contd.)

Date	Meeting	USFWS Personnel Present	NMFS Personnel Present	Important Decisions/Guidance Given/General Discussion
February 17, 2009	ECPWG meeting	Stephanie Rickabaugh	None	Reclamation described the two alternatives to be included in the EA/IS. The two alternatives will include the No-Action Alternative and one action alternative. The action alternative will describe sending flows as far as China Island in Reach 5; however, if legal constraints (such as land access) or regulatory constraints (such as discovery of the presence of a species fully protected by the State), flows will be delivered to an intermediate point (either the East Bear Creek Unit of the San Luis National Wildlife Refuge Complex or Mendota Pool) to avoid such constraints. Stephanie Rickabaugh and John Battistoni (DFG) will develop the survey protocol for blunt-nosed leopard lizard.
February 19, 2009	Reclamation meeting	None	Erin Strange and Leslie Mirise	Reclamation gave a briefing on the SJRRP to bring NMFS up to speed on current status. The WY 2010 Interim Flows proposal was discussed along with the overall SJRRP compliance strategies.
March 3, 2009	ECPWG meeting	Stephanie Rickabaugh	None	Interim Flows were discussed generally.
March 4, 2009	PMT Meeting	Dan Castleberry, John Engbring, Jeff McLain	Rhonda Reed	Expand the description for water year 2009-10 to include flows below Merced. Everyone agreed to pursue this change in strategy. NMFS comfortable with its ability to meet time lines and suggested Reclamation work with them on the draft BA as early as possible
March 19, 2009	ESA/CESA meeting	Stephanie Rickabaugh and Maryann Owens	Leslie Mirise	Blunt-nosed leopard lizard survey protocol from USFWS and DFG will be sent to Reclamation next week and will be used to determine the survey effort. It was noted that ESRP mapped elderberry shrubs throughout Reaches 1–5 and surveyed most of the shrubs for exit holes in 2004–2005; however, USFWS typically considers results valid for only 1 year.
March 24, 2009	ECPWG meeting	Stephanie Rickabaugh	Leslie Mirise	Stephanie Rickabaugh and John Battistoni (DFG) have completed the blunt-nosed leopard lizard survey protocols and are awaiting USFWS signature.
April 7, 2009	ECPWG meeting	Stephanie Rickabaugh	Leslie Mirise	Blunt-nosed leopard lizard surveys were discussed.

Table 2-1.
Endangered Species Act Consultation Conducted for the SJRRP (contd.)

Date	Meeting	USFWS Personnel Present	NMFS Personnel Present	Important Decisions/Guidance Given/General Discussion
April 16, 2009	ESA/CESA meeting	Stephanie Rickabaugh	None	Brad Hubbard (Reclamation) stated that there are issues obtaining land access in the bypass channel to survey for blunt-nosed leopard lizards; therefore, DFG and USFWS will meet on April 24, 2009, to discuss the possibility of assuming presence. The Interim flow BA outline will be sent to NMFS for its review and comment. It was agreed that there will be only one Interim Flows BA that will discuss terrestrial and aquatic species. Stephanie Rickabaugh would like more information on several species in the EA (e.g., riparian brush rabbit, California tiger salamander, valley elderberry longhorn beetle, San Joaquin kit fox). Stephanie Rickabaugh recommends that Reclamation make an environmental commitment in the Interim Flows BA to complete vegetation base maps. It was decided that the pictures taken during the invasive species surveys would not suffice for the recommended vegetation base map.
April 17, 2009	Reclamation meeting	John Engbring and Stephanie Rickabaugh	None	Special-status species strategy details, including the strategy for the blunt-nosed leopard lizard ESA/CESA approach for the WY 2010 Interim Flows proposal, were discussed.
April 21, 2009	ECPWG meeting	Stephanie Rickabaugh	Leslie Mirise	Leslie Mirise stated that NMFS needs to know if the Hills Ferry Barrier can withstand the expected Interim Flows, if the barrier will be replaced in the early spring to block steelhead, and if this will be considered a significant effect. One BA that addresses aquatic and terrestrial species for the Interim Flows will be developed by May 15, 2009, and will not address CESA. USFWS recommends that Reclamation make an environmental commitment to perform vegetation base mapping for the Interim Flows. NMFS and USFWS reviewed the draft BA outline.
April 22, 2009	Interim Flows meeting	Stephanie Rickabaugh	Leslie Mirise	The SJRRP office staff will provide a technical paper regarding expected operational requirements for the Hills Ferry Barrier that was drafted in support of legislation. The EA/IS description of actions related to the Hills Ferry Barrier will be revised based on this paper. Generally, the project description will include no change to the operation of the Hills Ferry Barrier.

Table 2-1.
Endangered Species Act Consultation Conducted for the SJRRP (contd.)

Date	Meeting	USFWS Personnel Present	NMFS Personnel Present	Important Decisions/Guidance Given/General Discussion
May 1, 1009	ESA/ CESA meeting	Stephanie Rickabaugh and Jeff McLain	Leslie Mirise	NMFS confirmed that Action Area for WY 2010 BA should extend to the south Delta. Jeff McLain provided revised Hills Ferry Barrier text to be inserted into the EA/IS and BA

Key:
BA = biological assessment
BO = biological opinion
CEQA = California Environmental Quality Act
EA/IS = environmental assessment/initial study
ECPWG = Environmental Compliance and Permitting Working Group
EIS/R = environmental impact statement/report
ESA/CESA = Endangered Species Act/California Endangered Species Act
ESRP = Endangered Species Recovery Program, California State University Stanislaus
MEI = Mussetter Engineering, Inc.
MWH = Montgomery Watson Harza
NMFS = National Marine Fisheries Service
PEIS/R = program environmental impact statement/report
SJRRP = San Joaquin River Restoration Program
SWRCB = State Water Resources Control Board
USFWS = U.S. Fish and Wildlife Service
WY = water year

3.0 Description of the Proposed Action

3.1 Overview of the San Joaquin River Restoration Program

In 1988, a coalition of environmental groups, led by the Natural Resources Defense Council (NRDC), filed a lawsuit challenging the renewal of long-term water service contracts between the United States and the CVP Friant Division Long-Term Contractors. After more than 18 years of litigation of this lawsuit, known as *NRDC, et al. v. Kirk Rodgers, et al.*, a Settlement was reached. On September 13, 2006, the Settling Parties – NRDC, Friant Water Users Authority, and the U.S. Departments of the Interior and Commerce—agreed on the terms and conditions of the Settlement, which was subsequently approved by the U.S. Eastern District Court of California on October 23, 2006.

The Settlement establishes two primary goals:

- **Restoration Goal –** To restore and maintain fish populations in "good condition" in the mainstem San Joaquin River below Friant Dam to the confluence of the Merced River, including naturally reproducing and self-sustaining populations of salmon and other fish.

- **Water Management Goal –** To reduce or avoid adverse water supply impacts on all of the Friant Division Long-Term Contractors that may result from the Interim Flows and Restoration Flows provided for in the Settlement.

The SJRRP will implement the Settlement. The implementing agencies responsible for managing the SJRRP are the U.S. Department of the Interior, through Reclamation and USFWS, U.S. Department of Commerce through NMFS, and the California Resources Agency through the California Department of Water Resources (DWR), DFG, and the California Environmental Protection Agency. The Settlement also stipulates the appointment of a Restoration Administrator (RA), in consultation with a technical advisory committee, to make recommendations to the U.S. Secretary of the Interior to help in meeting the Restoration Goal.

The Settlement stipulates the releases of both Interim Flows and Restoration Flows. The release of Interim Flows is to begin October 1, 2009, and continue until full Restoration Flows begin. The purpose of the Interim Flows is to collect relevant data on flows, temperatures, fish needs, seepage losses, recirculation, recapture, and reuse. Full Restoration Flows are described in Exhibit B of the Settlement.

The Act was passed by Congress on March 19, 2009, and signed into law by the President on March 30, 2009. The Act authorizes the Secretary of the Interior to direct and implement the following terms and conditions of the Settlement:

(1) Design and construct channel and structural improvements as described in Paragraph 11.

(2) Modify the operation of Friant Dam to provide Restoration Flows and Interim Flows.

(3) Acquire water, water rights, or options to acquire water as described in Paragraph 13.

(4) Implement the terms and conditions stipulated in Paragraph 16 related to recirculation, recapture, reuse, exchange, or transfer of water released for Restoration Flows and Interim Flows.

(5) Develop and implement the Recovered Water Account as specified in Paragraph 16(b), including the pricing and payment crediting provisions described in Paragraph 16(b)(3).

The actions proposed by Reclamation to implement Interim Flows in WY 2010 are needed to achieve compliance with the Act.

3.2 Description of the Restoration Area

The Restoration Area is defined geographically as the San Joaquin River from Friant Dam to the Merced River confluence. The San Joaquin River and flood bypasses within the Restoration Area are described as a series of physically and operationally distinct reaches, as shown in Figure 3-1 and defined in Table 3-1. Table 3-1 also identifies which river reaches and bypasses are included in the Restoration Area for evaluation of the Proposed Action. The geographic areas are described briefly below.

Millerton Lake and San Joaquin River from Kerckhoff Dam to Friant Dam

The San Joaquin River originates in the Sierra Nevada at an elevation of 12,000 feet above mean sea level (North American Vertical Datum 1988). Millerton Lake, formed by Friant Dam, is the largest reservoir on the San Joaquin River. Habitat surrounding Millerton Lake is fairly sparse, and the lake is surrounded by low hills. Inflow consists primarily of flows from the upper San Joaquin River and is influenced by the operation of several upstream hydropower generation projects, including those at Kerckhoff Dam. Millerton Lake typically fills during late spring and early summer, when San Joaquin River flows are high because of snowmelt in the upper watershed. Friant Dam diverts much of the water from the San Joaquin River to contractors within the CVP Friant Division’s water service area. Annual water allocations and release schedules are developed with the intent of drawing down reservoir storage to minimum levels by the end of September. The operation of Friant Dam changes storage levels in Millerton Lake, which in turn can influence resources affected by storage conditions and lake levels.

Figure 3-1.
San Joaquin River Reaches and the Flood Bypass System in the Restoration Area

Table 3-1.
San Joaquin River Reaches and Flood Bypasses in the Restoration Area Located within the Restoration Area for Water Year 2010 Interim Flows

San Joaquin River Reaches and Flood Bypasses in the Restoration Area				Restoration Area Reaches Included in Water Year 2010 Interim Flows Restoration Area
River or Bypass	**Reach**	**Head of Reach or Bypass**	**Downstream End of Reach or Bypass**	
San Joaquin River	**1A**	Friant Dam	State Route 99	✓
	1B	State Route 99	Gravelly Ford	✓
	2A	Gravelly Ford	Chowchilla Bifurcation Structure	✓
	2B	Chowchilla Bifurcation Structure	Mendota Dam	✓
	3	Mendota Dam	Sack Dam	✓
	4A	Sack Dam	Sand Slough Control Structure	✓
	4B1	Sand Slough Control Structure	Confluence with Mariposa Bypass	
	4B2	Confluence with Mariposa Bypass	Confluence with Bear Creek and Eastside Bypass	✓
	5	Confluence with Bear Creek and Eastside Bypass	Confluence with Merced River	✓
Chowchilla Bypass		Chowchilla Bifurcation Structure	Confluence with Ash Slough and Eastside Bypass	
Eastside Bypass		Confluence with Ash Slough and Chowchilla Bypass	Confluence with Bear Creek and San Joaquin River	✓
Sand Slough Bypass		Sand Slough Control Structure	Eastside Bypass	✓
Mariposa Bypass		Mariposa Bypass Bifurcation Structure	Confluence with San Joaquin River	✓

San Joaquin River from Friant Dam to the Merced River

SJRRP restoration activities focus on this approximately 150-mile reach of the San Joaquin River, termed the Restoration Area. The river and flood bypasses within the Restoration Area are a series of physically and operationally distinct reaches, as shown in Figure 3-1 and described below.

Reach 1. Reach 1 begins at Friant Dam and continues approximately 37 miles downstream to Gravelly Ford. This reach conveys continuous flows to Gravelly Ford. The reach is divided into two subreaches, 1A and 1B. Reach 1A extends from Friant Dam to State Route 99. Reach 1B continues from State Route 99 to Gravelly Ford. Reach 1 is the principal area identified for future salmon spawning, but this reach has been extensively mined for instream gravel and sediment supply is limited.

Reach 2. Reach 2 begins at Gravelly Ford and extends approximately 24 miles downstream to the Mendota Pool, continuing the boundary between Fresno and Madera counties. This reach marks the end of the incised channel and is a meandering channel of low gradient. Reach 2 is subdivided into two subreaches at the Chowchilla Bifurcation Structure. Both Reach 2A and Reach 2B are dry in most months. Reach 2A is subject to extensive seepage losses. Sand has accumulated in this subreach because of such factors as backwater effects of the Chowchilla Bifurcation Structure and the lower gradient of Reach 2A relative to Reach 1. Reach 2B is a sandy channel with limited conveyance capacity.

Reach 3. Reach 3 of the San Joaquin River conveys perennial flows of Delta water released from the Mendota Pool to Sack Dam, where flows are diverted to the Arroyo Canal. This reach continues the boundary between Fresno and Madera counties. The sandy channel meanders approximately 23 miles through a primarily agricultural area; diversion structures are common in this reach.

Reach 4. Reach 4 is approximately 46 miles long and is subdivided into three distinct subreaches. Reach 4A begins at Sack Dam and extends to the Sand Slough Control Structure. This subreach is dry in most months because flows are diverted to the Arroyo Canal at Sack Dam. All flows that reach the Sand Slough Control Structure are diverted to the flood bypass system via the Sand Slough Bypass, which has left Reach 4B1 perennially dry (with the exception of agricultural return flows) for more than 40 years. Reach 4B2 begins at the confluence of the Mariposa Bypass, where flood flows in the bypass system rejoin the mainstem San Joaquin River. Reach 4B2 extends to the confluence of the Eastside Bypass.

Reach 5. Reach 5 of the San Joaquin River extends approximately 18 miles from the confluence of the Eastside Bypass downstream to the Merced River confluence. This reach receives flows from Mud and Salt sloughs, channels that run through both agricultural and wildlife management areas.

Fresno Slough/James Bypass. Fresno Slough, also referred to as the James Bypass, conveys flood flows in some years from the Kings River system in the Tulare Basin to the Mendota Pool. These flows are regulated by Pine Flat Dam.

Chowchilla Bypass and Tributaries. The Chowchilla Bifurcation Structure at the head of Reach 2B regulates the flow split between the San Joaquin River and the Chowchilla Bypass. Operation of the structure is based on flows in the San Joaquin River, flows from the Kings River system via Fresno Slough, water demands in the Mendota Pool, and seasonality. Tributaries to the Chowchilla Bypass include the Fresno River and Berenda Slough. The Chowchilla Bypass extends to the confluence of Ash Slough, which marks the beginning of the Eastside Bypass.

Eastside Bypass, Mariposa Bypass, and Tributaries. The Eastside Bypass extends from the confluence of Ash Slough and the Chowchilla Bypass to the confluence with the San Joaquin River at the head of Reach 5. It is subdivided into three reaches. Reach 1 of the Eastside Bypass extends from Ash Slough to the Sand Slough Bypass confluence and receives flows from the Chowchilla River. Reach 2 of the Eastside Bypass extends from the Sand Slough Bypass confluence to the head of the Mariposa Bypass. Reach 3 of the Eastside Bypass extends from the head of the Mariposa Bypass to the head of San Joaquin River Reach 5 and receives flows from Deadman, Owens, and Bear creeks. The Mariposa Bypass extends from the Mariposa Bypass Bifurcation Structure to the head of San Joaquin River Reach 4B2. A drop structure located near the downstream end of the Mariposa Bypass dissipates energy from flows before they enter the mainstem San Joaquin River.

San Joaquin River from the Merced River to the Sacramento–San Joaquin Delta

The San Joaquin River downstream from the Merced River confluence to the Delta receives inflow from several large rivers, including the Merced, Tuolumne, and Stanislaus rivers. Several smaller rivers also join the San Joaquin River below the Stanislaus River confluence.

Sacramento–San Joaquin Delta

The Delta is a network of islands and channels at the confluence of the Sacramento and San Joaquin rivers. The Delta comprises approximately 750,000 acres, receives runoff from a watershed that includes more than 40 percent of California’s land area, and accounts for approximately 42 percent of the state’s annual runoff (Water Education Foundation 1992). Tributaries that directly discharge into the Delta include the Sacramento, San Joaquin, Mokelumne, Cosumnes, and Calaveras rivers. The Delta supplies water for most of California’s agricultural production and many urban and industrial communities across the state.

In the Delta, the Banks and the Jones pumping plants move water from the Delta to a system of canals and reservoirs for agricultural, municipal and industrial, and environmental uses in the San Joaquin Valley and the San Francisco Bay Area, along the central coast, and in portions of southern California. Surface-water resources in the Delta are influenced by the interaction of tributary inflows, tides, Delta hydrodynamics, regulatory requirements, and water management actions (e.g., reservoir releases, in-Delta diversions, and transfers).

The Delta also provides habitat for numerous plant, animal, and fish species, including several threatened or endangered species. The Delta serves as a migration path for all Central Valley anadromous species that return to their natal rivers to spawn; adult Chinook salmon move through the Delta during most of the year.

3.2.1 Merced River, Tuolumne River, and Stanislaus River

The Merced, Tuolumne, and Stanislaus rivers flow west from the Sierra Nevada to the San Joaquin River. Each of these rivers supports fisheries, including fall-run Chinook salmon. The confluence of the Merced River with the San Joaquin River is located at the end of San Joaquin River Reach 5. During high-flow events, a portion of Merced River flows is conveyed to the San Joaquin River through Merced Slough. The Tuolumne River flows approximately 150 miles to the San Joaquin River near Modesto and hosts fisheries for anadromous and other fish species. The Stanislaus River flows into the San Joaquin River just upstream from Vernalis.

3.3 Proposed Action

3.3.1 Summary

The Proposed Action is the implementation of the WY 2010 Interim Flows, including the release and potential downstream recapture of Interim Flows, the actions necessary to convey the flows in the San Joaquin River system to the Delta, and the monitoring action to be conducted during the WY 2010 Interim Flow releases. Interim Flows would be released to the San Joaquin River from Friant Dam October 1 to November 20, 2009, and February 1 to September 30, 2010, in accordance with the flow schedule presented in Exhibit B of the Settlement. Estimated maximum nonflood flows for each reach of the Restoration Area under the Proposed Action are shown in Table 3-2. Table 3-3 shows the change in estimated maximum nonflood flows under the Proposed Action. Estimated maximum nonflood flows in Tables 3-3 and 3-4 represent nonflood conditions in a Wet water year; flows would vary depending on the water year-type. The water year-type for WY 2010 cannot be determined until spring 2010.

WY 2010 Interim Flows released from Friant Dam would flow through the Restoration Area, combine with flows from major tributaries, and enter the Delta. However, these Interim Flows would be reduced or diverted as needed to avoid causing substantial adverse conditions in downstream reaches, as identified by the measures described in Section 3.5, “Environmental Commitments.”

The Proposed Action involves recapturing Interim Flows at locations along the San Joaquin River, in the Delta, or both to the maximum extent possible during WY 2010, and transferring this water back to the Friant Division Long-Term Contractors. The farthest downstream that Interim Flows could be recaptured during WY 2010 would be at the Jones and Banks pumping plants. The Proposed Action includes several diversion locations where Interim Flows could be recaptured:

- Existing CVP and SWP facilities in the Delta.
- The Mendota Pool at the downstream end of San Joaquin River Reach 2B.
- The Arroyo Canal at the downstream end of San Joaquin River Reach 3.
- The Lone Tree Unit of the Merced NWR (Lone Tree Unit) in Reach 2 of the Eastside Bypass.
- The East Bear Creek Unit of the San Luis NWR (East Bear Creek Unit) in Reach 3 of the Eastside Bypass.

WY 2010 Interim Flows recaptured along the San Joaquin River may provide deliveries in lieu of Delta-Mendota Canal (DMC) supplies. In this case, Delta exports would not change under the Proposed Action. Up to a like amount of exported water would be available for recirculation to the Friant Division using south-of-Delta facilities. No additional agreements would be required to recapture flows in the Restoration Area. Mutual agreements between Reclamation, DWR, the Friant Division Long-Term

Contractors, and other south-of-Delta CVP/SWP contractors could be required before recaptured water could be recirculated to the Friant Division.

Implementing the Proposed Action would result in a negligible increase in Delta inflow. It also would result in small changes to allowable Delta exports under existing operating criteria, consistent with prevailing and relevant laws, regulations, BOs, and court orders in place at the time the water is recaptured. Any additional Delta exports would be eligible for recirculation to the Friant Division. Subsequent exchange agreements between Reclamation, DWR, the Friant Division Long-Term Contractors, and other south-of-Delta CVP/SWP contractors could be required before this water could be recirculated. Recirculation would be subject to available capacity within the Jones and Banks pumping plants, the California Aqueduct, the DMC, San Luis Reservoir and related pumping facilities, and other storage and conveyance facilities of CVP/SWP contractors.

Recaptured water available to the Friant Division Long-Term Contractors would range from zero to the total amount of WY 2010 Interim Flows reaching the Delta. Reclamation would identify actual reductions in deliveries to the Friant Division Long-Term Contractors associated with releasing the WY 2010 Interim Flows.

Several other implementation considerations could further constrain the release of WY 2010 Interim Flows: water supply demand; operations of Mendota and Sack dams; agreements with landowners and other Federal, State, and local agencies; potential effects on listed species; and the potential for seepage. Each of these topics is discussed in further detail in Section 3.4, “Implementation Considerations.”

Table 3-2.
Estimated Maximum Nonflood Flows by Reach Under the Proposed Action

Timing of Interim Flow Releases		Estimated Maximum Flows (Interim Flows and Water Right Flows) at Locations in the Restoration Area[1] (cubic feet per second)									
Beginning Date	Ending Date	Head of Reach 1[2]	Head of Reach 2A[3]	Head of Reach 2B[4]	Head of Reach 3[5]	Head of Reach 4A[6]	In Reach 4B1	In Reach 4B2	In Eastside Bypass[6]	Head of Reach 5	Merced River Confluence[7]
10/1/2009	10/31/2009	350	195	115	715	115	0	115	115	115	415
11/1/2009	11/6/2009	700	575	475	1,075	475	0	475	475	475	775
11/7/2009	11/10/2009	700	575	475	1,075	475	0	475	475	475	775
11/11/2009	11/20/2009	350	235	155	755	155	0	155	155	155	555
11/21/2009[8]	1/31/2010[9]	120	5	0	600	0	0	0	0	0	400
2/1/2010	2/28/2010	350	255	175	775	175	0	175	175	175	675
3/1/2010	3/15/2010	500	375	285	885	285	0	285	285	285	785
3/16/2010	3/31/2010	1,500	1,375	1,225	1,300	1,225	0	1,225	1,225	1,225	1,700
4/1/2010	4/15/2010	1,620	1,475	1,300	1,300	1,300	0	1,300	1,300	1,300	1,700
4/16/2010	4/30/2010	1,620	1,475	1,300	1,300	1,300	0	1,300	1,300	1,300	1,700
5/1/2010	6/30/2010	1,660	1,475	1,300	1,300	1,300	0	1,300	1,300	1,300	1,700
7/1/2010	8/31/2010	350	125	45	645	45	0	45	45	45	320
9/1/2010	9/30/2010	350	145	65	665	65	0	65	65	65	340
Estimated Maximum Total Volume (thousand acre-feet)		605	493	411	702	411	0	411	411	411	681

Notes:
1 Regulated nonflood releases from Friant Dam and deliveries by the Delta-Mendota Canal, exclusive of agricultural return flows and natural drainage.
2 Assumes up to 230 cubic feet per second diverted by instream water right holders (e.g., holding contracts), consistent with Exhibit B of the Settlement.
3 Assumes up to 200 cubic feet per second lost through infiltration, consistent with Exhibit B of the Settlement.
4 Assumes up to approximately 2,600 cubic feet per second in maximum diversion capacity in the Mendota Pool for water right holders. Estimated maximum Interim Flows at the head of Reach 2B in water year 2010 account for seepage losses experienced in Reach 2A, consistent with Exhibit B of the Settlement.
5 Assumes up to 600 cubic feet per second released from the Mendota Pool to Reach 3 for diversions into the Arroyo Canal at Sack Dam.
6 Assumes up to 25 percent of flow lost through infiltration downstream from Sack Dam, and up to 80 cubic feet per second diverted at wildlife refuges.
7 Assumes accretions from Mud and Salt sloughs in Reach 5, consistent with Exhibit B of the Settlement.
8 No Interim Flows during this portion of water year 2010.
9 Assumes a Wet water year-type. Flows may be lower under other water year-types.

Table 3-3.
Change in Estimated Maximum Nonflood Flows Under the Proposed Action from Baseline Conditions

Timing of Interim Flow Releases		Change in Estimated Maximum Flows at Locations in the Restoration Area[1] (cubic feet per second)									
Beginning Date	Ending Date	Head of Reach 1[2]	Head of Reach 2A[3]	Head of Reach 2B[4]	Head of Reach 3[5]	Head of Reach 4A[6]	In Reach 4B1	In Reach 4B2	In Eastside Bypass[6]	Head of Reach 5	Merced River Confluence[7]
10/1/2009	10/31/2009	190	190	115	115	115	0	115	115	115	115
11/1/2009	11/6/2009	570	570	475	475	475	0	475	475	475	475
11/7/2009	11/10/2009	570	570	475	475	475	0	475	475	475	475
11/11/2009	11/20/2009	230	230	155	155	155	0	155	155	155	155
11/21/2009[8]	1/31/2010[8]	0	0	0	0	0	0	0	0	0	0
2/1/2010	2/28/2010	250	250	175	175	175	0	175	175	175	175
3/1/2010	3/15/2010	370	370	285	285	285	0	285	285	285	285
3/16/2010	3/31/2010	1,370	1,370	1,225	700	1,225	0	1,225	1,225	1,225	1,225
4/1/2010	4/15/2010	1,470	1,470	1,300	700	1,300	0	1,300	1,300	1,300	1,300
4/16/2010	4/30/2010	1,470	1,470	1,300	700	1,300	0	1,300	1,300	1,300	1,300
5/1/2010	6/30/2010	1,470	1,470	1,300	700	1,300	0	1,300	1,300	1,300	1,300
7/1/2010	8/31/2010	120	120	45	45	45	0	45	45	45	45
9/1/2010	9/30/2010	140	140	65	65	65	0	65	65	65	65
Estimated Maximum Total Volume (thousand acre-feet)		489	489	411	273	411	0	411	411	411	411

Notes:
1 Regulated nonflood releases from Friant Dam and deliveries by the Delta-Mendota Canal, exclusive of agricultural return flows and natural drainage.
2 Assumes up to 230 cubic feet per second diverted by instream water right holders (e.g., holding contracts), consistent with Exhibit B of the Settlement.
3 Assumes up to 200 cubic feet per second lost through infiltration, consistent with Exhibit B of the Settlement.
4 Assumes up to 2,621 cubic feet per second in maximum diversion capacity in the Mendota Pool for water right holders.
5 Assumes up to 600 cubic feet per second released from the Mendota Pool to Reach 3 for diversions into the Arroyo Canal at Sack Dam.
6 Assumes up to 25 percent of flow lost through infiltration downstream from Sack Dam, and up to 80 cubic feet per second diverted at wildlife refuges.
7 Assumes accretions from Mud and Salt sloughs in Reach 5, consistent with Exhibit B of the Settlement.
8 No Interim Flows during this portion of water year 2010.

3.3.2 Settlement Flow Schedules

The annual quantity of water to be released from Friant Dam as WY 2010 Interim Flows under the Proposed Action is defined by the hydrologic year–type classifications provided in Exhibit B, consistent with the Restoration Flow Guidelines (SJRRP 2008). The allocated quantity would be applied to the hydrographs in Exhibit B and reduced, as appropriate, within the limits of channel capacity (see Table 3-4), anticipated infiltration losses, and diversion capacities. Additional reductions in flow could be made, in consideration of water supply demands, presence of listed species, and potential seepage effects, as described in Section 3.4 and in the Seepage Monitoring and Management Plan, as described in Section 3.5.1. The resulting hydrograph would be subject to the application of flexible flow provisions described in Exhibit B, as requested by the RA. Settlement provisions related to Buffer Flows and purchased-water provisions are not applicable to Interim Flows. Guidance provided in the Settlement would further define the schedule and magnitude of flow releases and additional modifications to flows.

Table 3-4.
Estimated Maximum Water Year 2010 Interim Flows by Reach

Reach	Estimated Deliveries[1] (cfs)	Infiltration Losses[1] (cfs)	Estimated Existing Channel Capacity[2] (cfs)	Estimated Maximum Flow in Reach[3,4] (cfs)
1	230	0	8,000	1,660
2A	0	200	8,000	1,475
2B	0	0	1,300	1,300
3	0	0	1,300	1,300
4A	0	0	4,500	1,300
4B1[5]	0	0	0	0
4B2	0	0	4,500	1,300
5	0	0	26,000	1,775[6]
Mariposa Bypass	0	0	8,500	1,300
Eastside Bypass Reach 1	0	0	17,000	1,300
Eastside Bypass Reach 2	0	0	16,500	1,300
Eastside Bypass Reach 3	0	0	13,500	1,300

Sources: McBain and Trush 2002; RMC 2003, 2007

Notes:

[1] Loss estimates incorporated into flow targets, as defined in Exhibit B of the Settlement. Includes infiltration losses in Reach 2, and water right diversions in Reach 1.

[2] Estimated existing nondamaging channel capacity is based on best available information and may be revised as new information becomes available as part of the SJRRP.

[3] Nonflood conditions.

[4] Does not include potential discontinuous local flow such as agricultural and natural drainage.

[5] The Proposed Action does not include any activity in Reach 4B1.

[6] Includes existing inflow from Mud and Salt sloughs of up to 500 cfs, as defined in Exhibit B.

Key:
cfs = cubic feet per second

Restoration Year-Type Classification

To facilitate future implementation of the Settlement, the SJRRP has developed a year-type classification system based on annual October-through-September unimpaired flow below Friant Dam from WY 1922 through WY 2004 (SJRRP 2008), as shown in Table 3-5.

Table 3-5.
Restoration Year-Types as Defined in Exhibit B of the Settlement

Restoration Year-Type[1]	Range of Unimpaired Inflow to Millerton Lake (acre-feet per year)	Percentage of Years from 1922 Through 2005
Wet	Greater than 2,500,000	20 percent
Normal-Wet	Greater than 1,450,000 to 2,500,000	30 percent
Normal-Dry	Greater than 930,000 to 1,450,000	30 percent
Dry	Greater than 670,000 to 930,000	15 percent
Critical-High	400,000 up to 670,000	5 percent
Critical-Low	Less than 400,000	

Note:
[1] A restoration year begins October 1 and ends on September 30 of the following calendar year.

The restoration year-type for WY 2010 Interim Flow releases will be determined and finalized in June 2009 using information considered in making water supply allocations, including the DWR *Bulletin 120* forecast (being finalized in May 2009).

Schedule and Magnitude of Restoration Flow Releases

The RA may recommend additional changes in specific release schedules, such as ramping rates, to smooth the transition through the hydrograph, as long as such changes would not alter the total amount of water required to be released pursuant to the applicable hydrograph. The Wet-year flow schedule, shown in Figure 3-2, identifies the estimated maximum effects associated with WY 2010 Interim Flow releases, but would be reduced, as appropriate, by the limits of channel capacity. This flow schedule is used to determine potential impacts in this BA.

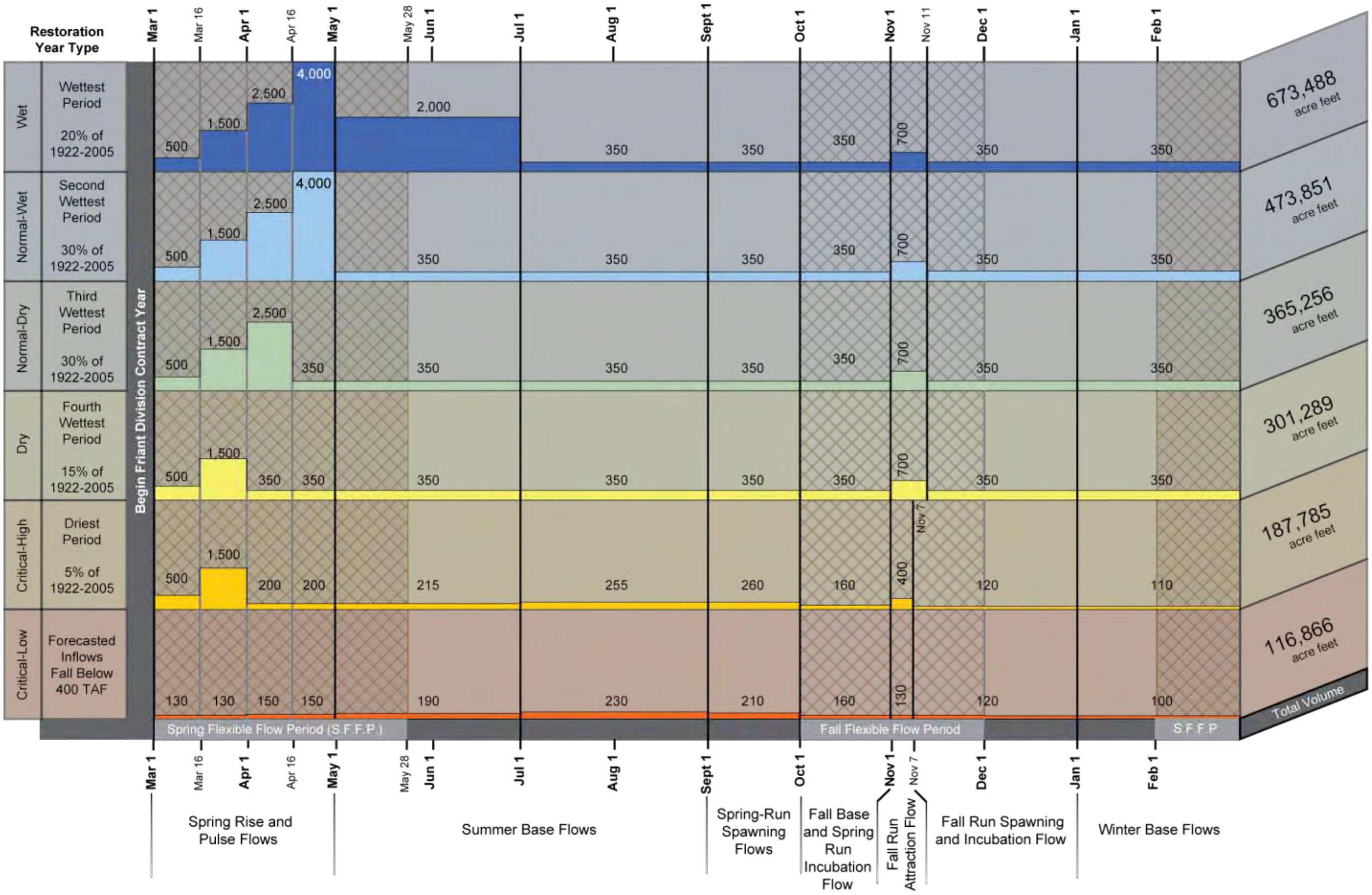


Figure 3-2.
Restoration Flow Schedules by Restoration Year-Type, as Specified in Exhibit B of the Settlement

Flow Modifications

The Settlement defines several additional modifications to flow schedules to benefit fisheries within the Restoration Area. These modifications include flexible flow periods, Buffer Flows, and the acquisition and release of additional water. Because Chinook salmon will not be reintroduced to the river during WY 2010, and because the purpose of WY 2010 Interim Flows is to collect relevant data, WY 2010 Interim Flows would not include the application of Buffer Flows or the release of additional water.

WY 2010 Interim Flows could include application of flexible flow periods to provide additional data collection opportunities. The Settlement identifies flexible flow periods during spring and fall periods that allow flows to be shifted up to 4 weeks earlier or later than shown in the Exhibit B flow schedules. During flexible flow periods, the water released may be less than the volume identified in the flow schedule because of constraints (such as channel capacity). The volume of Restoration Flows above the estimated maximum WY 2010 Interim Flows would not be applied earlier or later within the flexible flow period to increase the total allocation made for the appropriate year type, as illustrated in Figure 3-3.

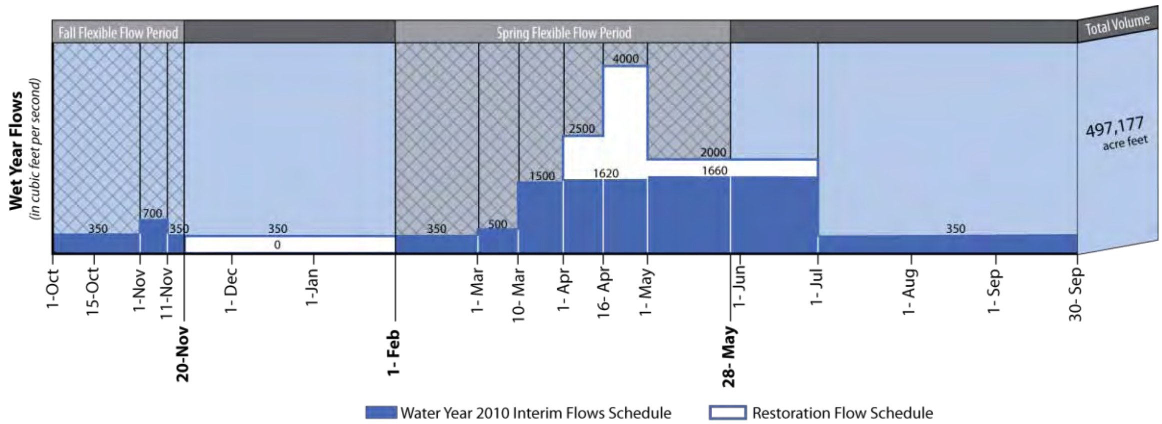


Figure 3-3.
Estimated Maximum Average Water Year 2010 Interim Flows from Friant Dam Assuming a Wet Year

3.3.3 Flow Considerations by Reach

The maximum downstream extent of WY 2010 Interim Flows that could be recaptured would be at the Jones and Banks pumping plants in the Delta. Maximum flows released from Friant Dam would be based on downstream conveyance capacity and forecasted water year type. The river and flood bypasses within the Restoration Area are described as a series of physically and operationally distinct reaches, with channel capacity constraints, gains, and infiltration losses, as defined in the following sections. Considerations within each reach and below the Merced River confluence are described below.

Under existing nonflood conditions, most reaches of the San Joaquin River and the associated bypass system within the Restoration Area convey local agricultural return flows and runoff. Under flood conditions, seepage through levees has been observed. The release of WY 2010 Interim Flows would gradually increase to target flow rates while seepage is monitored. As described in the Act, WY 2010 Interim Flows would be reduced, as needed. Monitoring and management actions are part of the Proposed Action operations, and are described in more detail in the Seepage Monitoring and Management Plan presented in Appendix D, Attachment 1.

The release of WY 2010 Interim Flows would be managed to avoid interfering with operations of the San Joaquin River Flood Control Project. This includes operations of the Chowchilla Bypass Bifurcation Structure, Sand Slough Control Structure, Eastside Bypass Bifurcation Structure, and Mariposa Bypass Bifurcation Structure, as well as San Joaquin River Flood Control Project levee maintenance. Specifically, under the Proposed Action, no change in flood operations at the Chowchilla Bypass Bifurcation Structure would occur. Releases of flood flows to the San Joaquin River would remain constrained by the capacity of the portion of Reach 2B below the Chowchilla Bypass Bifurcation Structure.

Reach 1

Channel capacity in Reach 1 is approximately 8,000 cfs, which exceeds the estimated maximum potential flow releases from Friant Dam under the WY 2010 Interim Flows. Therefore, channel capacity would not limit WY 2010 Interim Flows in Reach 1. The Exhibit B flow schedules include assumed holding contract releases to Reach 1, as shown in Table 3-6. Estimated maximum flows under the Proposed Action, as shown in Table 3-2, include releases to meet these diversions. Because this channel carries continuous flow under existing conditions, Reach 1 is not expected to lose water through infiltration of flows released over and above Reach 1 holding contract releases.

Table 3-6.
Riparian Releases Identified in Reach 1 in Exhibit B of the Settlement

Timing of WY 2010 Interim Flows		Reach 1 Riparian Releases (cfs)
Beginning Date	Ending Date	
10/1/2009	10/31/2009	160
11/1/2009	11/6/2009	130
11/7/2009	11/10/2009	130
11/11/2009	11/20/2009	120
11/21/2009	1/31/2010	120
2/1/2010	2/28/2010	100
3/1/2010	3/15/2010	130
3/16/2010	3/31/2010	130
4/1/2010	4/15/2010	150
4/16/2010	4/30/2010	150
5/1/2010	6/30/2010	190
7/1/2010	8/31/2010	230
9/1/2010	9/30/2010	210

Key:
cfs = cubic feet per second
WY = water year

Reach 2

Estimated maximum WY 2010 Interim Flows would be constrained by the existing channel capacity of Reach 2B. DWR has estimated the channel capacity in Reach 2B to be 1,500 cfs. Local landowners have stated that the conveyance capacity of Reach 2B is approximately 1,300 cfs (RMC 2007). Therefore, estimated maximum WY 2010 Interim Flows would not exceed 1,300 cfs in Reach 2B. To accommodate this presumed capacity limitation, WY 2010 Interim Flow releases at Friant Dam would be less than the quantity included in the Exhibit B flow schedules from April 1 to June 30 of 2010, if the year-type is determined to be normal-dry, normal-wet, or wet. Table 3-7 shows the capacity restrictions on estimated maximum flows, reflecting nonflood conditions in a wet year.

The Exhibit B flow schedules include assumptions about infiltration losses in Reach 2A (Table 3-7). Estimated maximum nonflood flows under the Proposed Action (Table 3-2) include these losses.

Table 3-7.
Infiltration Losses Identified for Reach 2A and in Exhibit B

Timing of Interim Flow Releases		Infiltration Losses in Reach 2A by Year-Type (cfs)					
Beginning Date	Ending Date	Critical-Low	Critical-High	Dry	Normal-Dry	Normal-Wet	Wet
10/1/2009	10/31/2009	80	80	80	80	80	80
11/1/2009	11/6/2009	100	100	100	100	100	100
11/7/2009	11/10/2009	80	80	100	100	100	100
11/11/2009	11/20/2009	80	80	80	80	80	80
11/21/2009	1/31/2010	*No WY 2010 Interim Flows During this Period*					
2/1/2010	2/28/2010	80	80	80	80	80	80
3/1/2010	3/15/2010	90	90	90	90	90	90
3/16/2010	3/31/2010	150	150	150	150	150	150
4/1/2010	4/15/2010	80	80	80	175	175	175
4/16/2010	4/30/2010	80	80	80	80	200	200
5/1/2010	6/30/2010	80	80	80	80	80	165
7/1/2010	8/31/2010	80	80	80	80	80	80
9/1/2010	9/30/2010	80	80	80	80	80	80

Key:
cfs = cubic feet per second
WY = water year

WY 2010 Interim Flows would flow through Reach 2 and the Mendota Pool, unless downstream considerations (e.g., channel capacity, presence of special-status species) require that less (or no) flow enters Reach 3. Under the Proposed Action, WY 2010 Interim Flows could be diverted from the Mendota Pool to the extent that these flows would meet demands, replacing CVP water supplies that otherwise would be delivered via the DMC. The DMC carries water from the Delta to the Mendota Pool, where it is diverted through several existing pumps and canals with a combined capacity that exceeds upstream channel capacity, and therefore would not constrain WY 2010 Interim Flows. WY 2010 Interim Flows would be diverted by CVP contractors at the Mendota Pool in lieu of using supplies typically delivered via the DMC. Therefore, CVP water supplies in south-of-Delta facilities would be available for delivery to the Friant Division, subject to existing agreements with other south-of-Delta CVP contractors for the use of water storage and conveyance facilities.

Central California Irrigation District (CCID) operates and maintains Mendota Dam in Reach 2. CCID is responsible for maintaining the dam under a very narrow operating range and provides no operational storage for water supply operations (RMC 2003). The San Luis Delta Mendota Water Authority (SLDMWA) operates and maintains the Mendota Pool on behalf of Reclamation. The Mendota Pool is held at a fairly constant elevation between 14.2 and 14.5 feet above mean sea level to maintain deliveries to water users in the upper end of the Mendota Pool/Fresno Slough areas (RMC 2003). To maintain this constant elevation, releases from Mendota Dam need to be made via the gates and with boards at the dam in place. The gates have a release capacity of approximately 1,500 cfs. Under the Proposed Action, operations at the Mendota Pool would maintain water-surface elevations within the range of existing operations.

Reach 3

Reach 3 currently conveys flows from the Mendota Dam to the Arroyo Canal at Sack Dam for diversion. Diversions to the Arroyo Canal range from zero to 800 cfs, and typically do not exceed 600 cfs. Flows in Reach 3 vary based on the time of year, water demands, and available water supplies. Release constraints at the Mendota Pool are implemented to avoid potential adverse effects associated with the diversion capabilities identified above. The RMC has reported that Reach 3 conveys up to 800 cfs of water for irrigation diversions at Sack Dam, and that higher flows (less than 4,500 cfs) can cause seepage and levee stability problems in this reach (2007). In 2006, the U.S. Geological Survey recorded a mean maximum daily discharge of 4,590 cfs; DWR reported that seepage occurred on lands in and adjacent to the floodway at this time. DWR has estimated the capacity of interior levees in this reach to be 1,300 cfs with 3 feet of freeboard. WY 2010 Interim Flow releases from Mendota Dam would be reduced in proportion to releases from Mendota Dam by the San Joaquin River Exchange Contractors for diversion at the Arroyo Canal, such that the combined WY 2010 Interim Flows and irrigation supply flows would not exceed 1,300 cfs. Because Reach 3 currently conveys flow, it is assumed that infiltration losses related to WY 2010 Interim Flows in Reach 3 would be negligible.

WY 2010 Interim Flows would flow through Reach 3 and Sack Dam, unless downstream considerations (such as channel capacity or potentially adverse effects) require that less flow enters downstream reaches, as described above for Reach 2. Under the Proposed Action, WY 2010 Interim Flows could be diverted at the Arroyo Canal to the extent that these flows would meet demands (up to 800 cfs), replacing CVP water supplies that would otherwise be delivered via the Mendota Pool and DMC. This diversion could be combined with diversions at the Mendota Pool, as described above, and/or with reductions in flow release at Friant Dam to reduce inflow to Reach 4A.

Reach 4A

The estimated maximum flow in Reach 4A under the Proposed Action (nonflood conditions) would be 1,300 cfs because of upstream constraints described above for Reach 2B. No factors were identified in Reach 4A that would reduce or otherwise constrain WY 2010 Interim Flows.

Exhibit B assumes that Reach 4A experiences seasonal losses; however, these losses are not specified. Because Reach 4A conveys no flow in most years (i.e., is a dry channel), some initial infiltration losses are anticipated in this reach under WY 2010 Interim Flows. Flows would be monitored to obtain relevant information regarding infiltration losses.

WY 2010 Interim Flows at the downstream end of Reach 4A would be conveyed through Sand Slough to the Eastside Bypass. These flows would not be conveyed into Reach 4B1 because the capacity of Reach 4B1 is currently unknown and may be 0 cfs in some locations.

Eastside and Mariposa Bypasses

The estimated maximum WY 2010 Interim Flows conveyed to the Eastside and Mariposa bypasses would be 1,300 cfs because of upstream capacity constraints in Reach 2B, as described above. WY 2010 Interim Flows would enter Eastside Bypass Reach 2 via Sand Slough. Flows would either be routed through the Mariposa Bypass back to the San Joaquin River at the head of Reach 4B2, or through Eastside Bypass Reach 3 back to the San Joaquin River at the head of Reach 5.

Conveyance of WY 2010 Interim Flows through the Eastside and Mariposa bypasses would be limited, as necessary, by biological requirements determined through currently ongoing field surveys for listed species. In addition, agreements would be required with Eastside Bypass landowners to allow conveyance of WY 2010 Interim Flows. WY 2010 Interim Flows would be conveyed through the bypasses to Reaches 4B and 5, unless downstream considerations (such as channel capacity or potential take of listed species that could not be avoided) require that less (or no) flow enters the downstream reaches. Flow considerations in Eastside Bypass Reaches 2 and 3, and in the Mariposa Bypass, are discussed below.

Eastside Bypass Reach 2. If downstream considerations (such as channel capacity or potentially adverse effects) require that less (or no) flow enters reaches downstream from Eastside Bypass Reach 2, WY 2010 Interim Flows could be diverted in Eastside Bypass Reach 2 to the Lone Tree Unit (up to 20 cfs).

Under the Proposed Action, WY 2010 Interim Flows could be diverted at the Lone Tree Unit to the extent that these flows would meet demands, replacing other water supplies including Merced Irrigation District deliveries. This diversion could be combined with diversions at the Mendota Pool and/or Arroyo Canal, as described for Reaches 2 and 3, and/or with reductions in flow release at Friant Dam to reduce or eliminate inflow to Eastside Bypass Reach 3.

The Lone Tree Unit has historically diverted water from Eastside Bypass Reach 2 using a 25-horsepower permanent lift station last operated in 1997 (Forrest, pers. comm., 2009). The Lone Tree Unit currently diverts water from the Eastside Bypass using a 350-horsepower portable pump. The pumps are ordinarily operated in conjunction with weirs to back up water in the bypass to provide temporary habitat for waterfowl. To maintain suitable conditions within the ponded water, flow-through is maintained past the weirs.

Eastside Bypass Reach 3. If considerations in Mariposa Bypass and Reach 4B2 or in downstream reaches (such as channel capacity or potential take of listed species that could not be avoided) require that less (or no) flow enters those reaches, WY 2010 Interim Flows could be diverted to the East Bear Creek Unit in Eastside Bypass Reach 3.

Under the Proposed Action, WY 2010 Interim Flows could be diverted at the East Bear Creek Unit to the extent that these flows would meet demands, replacing CVP water supplies that would otherwise be delivered via the Mendota Pool and DMC. This diversion could be combined with diversions at the Mendota Pool, Arroyo Canal, and/or the Lone Tree Unit, as described for Reaches 2 and 3 and Eastside Bypass Reach 2, and/or with reductions in flow releases at Friant Dam to reduce or eliminate inflow to Eastside Bypass Reach 3.

The East Bear Creek Unit has a pump lift station in the Eastside Bypass with a diversion capacity of 60 cfs. This pump stations features a 48-inch-diameter intake structure and four 125-horsepower electric motors driving 15 cfs pumps. Under these circumstances, deliveries of WY 2010 Interim Flows to the East Bear Creek Unit would be further constrained by actual demand for water supplies at the East Bear Creek Unit.

The diversion of WY 2010 Interim Flows at the East Bear Creek Unit could be exchanged for CVP water supplies that otherwise would be delivered to the East Bear Creek Unit. These CVP water supplies would then be available for recirculation to the Friant Division. Reclamation would assist Friant Division long-term contractors with arranging agreements for the transfer or exchange of flows recaptured at these locations.

Mariposa Bypass. The estimated maximum flow in the Mariposa Bypass under the Proposed Action (nonflood conditions) would be 1,300 cfs because of upstream capacity constraints described above for Reach 2B. Conveyance of WY 2010 Interim Flows through the Mariposa Bypass would be limited, as described above, by biological requirements determined through field surveys for listed species and ensuring that flows are restricted to the low-flow channel. If downstream considerations require that less (or no) flow enters those reaches, WY 2010 Interim Flows would be diverted in upstream reaches, as described above.

Reach 4B

WY 2010 Interim Flows would not enter Reach 4B1. WY 2010 Interim Flows could be routed through Reach 2 of the Eastside Bypass and the Mariposa Bypass and conveyed to Reach 4B2, as shown in Figure 3-1. No factors were identified in Reach 4B2 that would reduce or otherwise constrain WY 2010 Interim Flows. Because of upstream capacity constraints in Reach 2B, as described above, the estimated maximum WY 2010 Interim Flow conveyed to Reach 4B2 would be 1,300 cfs.

Exhibit B states that Reach 4B is likely a gaining reach, but additional flows gained are not quantified in the Exhibit B flow schedules. The additional flows occur under baseline conditions and under the Proposed Action, but are not reflected in the estimated maximum nonflood flows shown in Tables 3-2 through 3-4.

Reach 5

The estimated maximum flow in Reach 5 under the Proposed Action (nonflood conditions) would be 1,300 cfs because of upstream capacity constraints described above for Reach 2B. No factors were identified in Reach 5 that would reduce or otherwise constrain WY 2010 Interim Flows.

Accretions in Reach 5 of up to 500 cfs from Mud and Salt sloughs are assumed in Exhibit B, are incorporated into the flow schedules shown in Table 3-4, and are reflected in the estimated maximum nonflood flows shown in Tables 3-3 through 3-5. Exhibit B assumes that Reach 5 gains additional flows of up to 50 cfs from other sources, but these are not incorporated into the Exhibit B flow schedules. These flows occur under baseline conditions and under the Proposed Action, but are not reflected in the estimated maximum nonflood flows shown in Tables 3-3 through 3-5.

Population numbers of Central Valley steelhead present on the San Joaquin tributaries (Stanislaus, Tuolumne, and Merced rivers) are unknown, owing to limited data, but the numbers likely range in the tens to low hundreds. Steelhead in the Restoration Area during Interim Flows are highly unlikely, and the Proposed Action will use existing facilities to prevent the unwanted upstream migration of Central Valley steelhead during fall Interim Flows (October 1 to November 20, 2009). Monitoring for the potential presence of Central Valley steelhead during spring Interim Flows (starting on February 1, 2010) would occur, and is further described below.

San Joaquin River Downstream from the Merced River Confluence

WY 2010 Interim Flows that reach the confluence of the Merced River could increase San Joaquin River flows by up to 1,300 cfs. The Merced, Tuolumne, and Stanislaus rivers are the three main tributaries to the lower San Joaquin River. Releases from major reservoirs on the three main tributaries are made in response to multiple operational objectives: flood management, downstream diversions, instream fisheries flows, instream water quality flows, and releases to meet water quality and flow objectives at Vernalis as part of requirements under the Vernalis Adaptive Management Program (VAMP). VAMP is an experimental program to release flows primarily from tributary reservoirs based on flow conditions on the San Joaquin River at Vernalis. VAMP flows include a 31-day pulse in April and May of up to 110 thousand acre-feet depending on estimated unimpaired flow conditions. Tributary releases to meet VAMP water quality objectives at Vernalis would be affected by the release of Interim Flows in WY 2010.

Sacramento–San Joaquin Delta

WY 2010 Interim Flows that reach the Delta, which would not exceed 1,300 cfs, could be diverted at existing CVP and SWP export facilities operated under existing regulatory requirements and institutional agreements. Because Reclamation does not hold a water right to Delta water for Friant Division deliveries, water recaptured in this manner would be available to existing south-of-Delta CVP and SWP water users. Available capacity within CVP/SWP storage and conveyance facilities could be used to facilitate exchanges and conveyance of water to the Friant Division by using recaptured Delta water supplies. Reclamation would assist the Friant Division Long-Term Contractors in arranging agreements for the transfer or exchange of flows recaptured at these locations. In addition, even if Interim Flows were not exported from the Delta, they would contribute to compliance with regulatory requirements in the Delta; as an indirect result, water released from upstream reservoirs to meet the regulatory requirements could be reduced by a commensurate amount. Recirculation would be subject to available capacity within the Jones and Banks pumping plants, the California Aqueduct, the DMC, San Luis Reservoir and related pumping facilities, and other storage and conveyance facilities of CVP/SWP contractors.

Evaluations of surface water resources and interrelated resources (e.g., water quality, fisheries, groundwater, socioeconomics) for this Draft EA/IS are based on a CalSim representation prepared in 2005 that reflects coordinated CVP/SWP long-term operations BOs in place at that time. Those BOs address the combined operational and regulatory setting under which the CVP and SWP facilities are operated. USFWS issued a new long-term operations BO in 2008, and NMFS is expected to issue a new long-term operations BO on listed Chinook salmon, steelhead, and green sturgeon in June 2009. Because the 2009 NMFS BO is still pending, and representations of 2008 USFWS BO Reasonable and Prudent Alternative (RPA) within numerical modeling tools are under development, the 2005 BO representation within CalSim is an appropriate tool for comparison purposes at this time. Further, the Proposed Action would continue to be in compliance with current or future long-term operations BOs.

3.4 Additional Implementation Considerations

Additional implementation considerations, such as potential environmental, regulatory, or legal issues, could further limit the release of WY 2010 Interim Flows, as described below.

Water Supply Demand

The maximum quantity of WY 2010 Interim Flows that could be diverted from the Restoration Area is limited by the combined diversion capacity at all identified diversion points. Actual diversions would be made according to demand for water supplies at these diversion points.

Implementation Agreements

Implementing the WY 2010 Interim Flows would require several agreements with local agencies. WY 2010 Interim Flows would be constrained by agreements in place at the time of release, including agreements with the San Joaquin River Exchange Contractors and USFWS regarding the timing and quantity of diversions. Additional agreements may include the following:

- **Central California Irrigation District** – As described above, CCID operates and maintains Mendota Dam. As part of normal operations, CCID dewaters the Mendota Pool approximately once every other year between November 25 and January 15 (RMC 2003) to conduct inspections required by the California Division of Safety of Dams. The Mendota Pool is scheduled to be dewatered in late 2009. If dewatering is scheduled during the WY 2010 Interim Flow periods identified in Table 3-1, no WY 2010 Interim Flow releases would be made to the Mendota Pool at that time. Agreements with CCID may be required before Interim Flows could be routed through Mendota Dam.

- **San Luis Canal Company** – San Luis Canal Company operates Sack Dam at the end of San Joaquin River Reach 3. Sack Dam is a 5-foot-high concrete and wood diversion structure that delivers water to the Arroyo Canal on the river's west side. Under typical base-flow conditions, all water that reaches Sack Dam is diverted to the Arroyo Canal. Flows greater than those required for diversion, including flood flows, spill over Sack Dam into the San Joaquin River. Agreements with San Luis Canal Company may be required before WY 2010 Interim Flows could be routed over Sack Dam.

- **Lower San Joaquin Levee District** – Agreements with the Lower San Joaquin Levee District may be required to operate, inspect, and maintain flood control facilities including levees, channels, flap gates, and bifurcation structures. These activities may include patrolling of levees to assess conditions, maintain channels, close flap gates prior to release of WY 2010 Interim Flows, and operate the Chowchilla, Eastside, and Mariposa bypass bifurcation structures.

- **U.S. Army Corps of Engineers** – Regulatory approval from USACE may be required to release Interim Flows from Friant Dam.

- **Central Valley Flood Protection Board** – Regulatory approval from the Central Valley Flood Protection Board may be required to release WY 2010 Interim Flows into the Eastside Bypass.

- **San Luis Delta Mendota Water Authority** – SLDMWA operates and maintains the Mendota Pool. Agreements with SLDMWA may be required before WY 2010 Interim Flows could be routed through the Mendota Pool.

Reclamation has initiated discussions with Central California ID, San Luis Canal Company, Lower San Joaquin Levee District, and staff at the Central Valley Flood Protection Board regarding implementing the Proposed Action. These discussions are ongoing. All agreements must be in place before introducing WY 2010 Interim Flows into the respective area of the river. Additionally, the amount of WY 2010 Interim Flows may be limited if any of the above agreements cannot be reached and/or if the terms of any of the above agreements include activities that limit flows.

3.5 Environmental Commitments

3.5.1 Minimization Commitments for Effects of Flows

Seepage Monitoring and Response Actions

The Act requires that a seepage monitoring program be prepared before releasing Interim Flows. The Seepage Monitoring and Management Plan (Appendix D) describes the monitoring and management guidelines included in the Proposed Action as related to groundwater or levee seepage. Some portions of the Restoration Area have historically experienced groundwater seepage to adjacent lands associated with elevated flows. Groundwater seepage has the potential to cause waterlogging of crops and salt mobilization in the crop root zone. Similarly, some portions of the Restoration Area have experienced levee instability resulting from through-levee and under-levee seepage during periods of elevated flows.

As part of the SJRRP, monitoring wells are being permitted and installed at several transects along the San Joaquin River in the Restoration Area to identify groundwater level responses to river flows. Reclamation and DWR would monitor groundwater levels in installed wells. Observed groundwater levels would be used by the Secretary in determining when to reduce flow releases from Friant Dam as required by the Act. Following installation of each monitoring well, groundwater elevations thresholds would be developed in consideration of nearby land uses, known groundwater and subsurface conditions, and other information available or provided by landowners.

In general, groundwater depth thresholds would be classified in three ranges (Figure 3-4):

- *An acceptable zone* at which groundwater levels are not expected to affect agricultural production.
- *A buffer zone* indicating an increased likelihood that seepage could affect agricultural production without flow modification.
- *An threat zone* representing groundwater levels that affect agricultural production.

The Proposed Action includes flow reductions in response to groundwater levels observed in the buffer or threat zones.

Other potential thresholds that would be used to identify the need for action include the following:

- Surface water stage corresponding to known or observed levee stability problems and lateral seepage
- Visual observation of boils or piping
- Landowner communication of observed seepage problems

If groundwater levels at a monitoring well exceed an identified threshold, WY 2010 Interim Flows would be reduced or diverted.

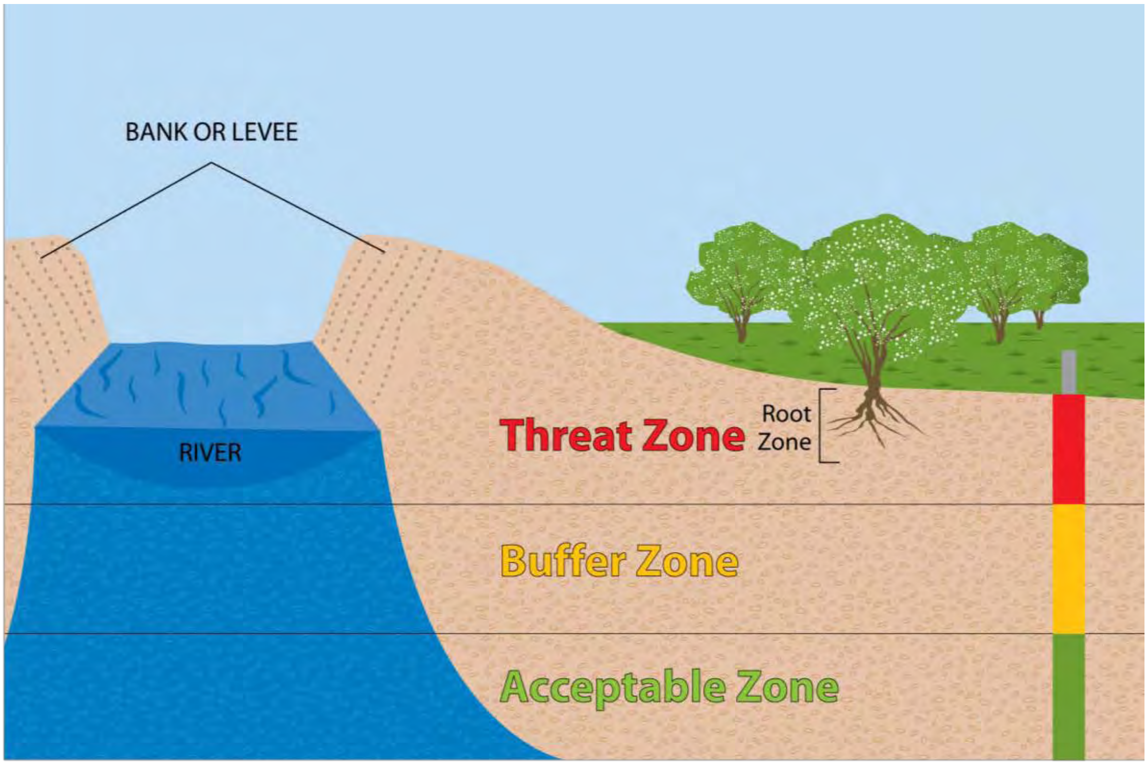


Figure 3-4.
Potential Groundwater Seepage Thresholds Zones

Flow Monitoring

The Act requires that a flow monitoring program be prepared before releasing Interim Flows. The Flow Monitoring and Management Plan describes management objectives for WY 2010 Interim Flows, approaches for measuring WY 2010 Interim Flows, conditions indicating that management objectives have been attained, and potential actions that could be taken to address nonattainment of the WY 2010 Interim Flow objectives. The Flow Monitoring and Management Plan will include measurement of streamflows at six locations within the Restoration Area.

3.5.2 Conservation Measures for Listed Species

The presence of certain special-status species in the Action Area may determine specific quantities and routing of instream flows, as discussed below.

Delta Fish Species

Ongoing consultations on Delta fish species with USFWS, NMFS, and DFG are occurring to comply with the Federal ESA; consultation is required to implement the Proposed Action. The maximum downstream extent of WY 2010 Interim Flows that could be recaptured would be at the Jones and Banks pumping plants. Recapture of WY 2010 Interim Flows at the Jones and Banks pumping plants would be subject to existing or future regulatory requirements and would be done in compliance with existing or future long-term operations BOs.

Hills Ferry Barrier

The current Hills Ferry Barrier is a type of resistance weir commonly used to exclude and/or trap anadromous fish in rivers. This barrier consists of panels aligned perpendicular to the flow of the river with evenly spaced pipes that allow water, small fish, and particles to pass but prevent larger anadromous fish such as Chinook salmon from passing upstream. Operated by DFG since 1992, the Hills Ferry Barrier is typically installed in mid-September and operated until it is removed in early December. DFG currently operates the Hills Ferry Barrier near the town of Newman, approximately 300 feet upstream from the confluence with the Merced River (in Reach 5).

The barrier's main purpose is to redirect upstream-migrating adult fall-run Chinook salmon into suitable spawning habitat in the Merced River and prevent migration into the mainstem San Joaquin River upstream, where conditions are currently unsuitable for Chinook salmon. Central Valley steelhead migrate during fall and spring in a manner similar to migration by fall-run Chinook salmon, and they have a similar body type; therefore, maintenance of the Hills Ferry Barrier would continue for the purpose of redirecting Chinook salmon during the fall WY 2010 Interim Flow period. The barrier is expected to be equally effective in redirecting any Central Valley steelhead.

NMFS permits the take of Federally listed threatened species for various State and nongovernmental agencies through the ESA Section 10a(1)A and 4(d) rules in the unlikely event that that anadromous fish, including Central Valley steelhead, stray into San Joaquin River reaches above the Merced River. DFG applies annually for an ESA Section 4(d) research permit and accompanying take limit for Central Valley steelhead from NMFS for operation of the barrier. In 2008, DFG was allowed to take up to five Central Valley steelhead. DFG was issued a permit for 2009 (expires on December 31, 2009) with a take limit of 10 Central Valley steelhead. If Central Valley steelhead are encountered at or above the Hills Ferry Barrier during fall Interim Flows, the Central Valley steelhead would be released downstream in suitable reaches as required by the permit.

Historic streamflow conditions upstream from the Merced River confluence during the spring averaged from 119 cfs to 13,050 cfs, with peak flows reaching 59,000 cfs in 1997. WY 2010 Interim Flows may add an average of up to 220 cfs at this location beginning on February 1, 2010. This small increase is not anticipated to trigger any change to Central Valley steelhead migration patterns in the San Joaquin Basin. As well, WY 2010 Interim Flows will not be released if natural flows approach channel capacity. However, the Proposed Action will develop a monitoring plan to check for Central Valley steelhead in the Restoration Area during spring Interim Flows. In the event a steelhead is encountered in the Restoration Area, NMFS will be notified immediately. In addition, stranded steelhead will be recovered and returned downstream in an appropriate location designated by DFG and/or NMFS. Salvaged fish will likely have genetic samples (i.e., fin clips) taken.

Preflow Release Surveys for Blunt-Nosed Leopard Lizard

In the absence of avoidance measures, blunt-nosed leopard lizard (BNLL) in the Eastside and Mariposa bypasses could be adversely affected. The presence of BNLL would be determined based on the results of preflow release surveys of the Eastside and Mariposa bypasses, conducted by qualified biologists in accordance with USFWS survey methodologies for BNLL developed specifically for the SJRRP. Surveys would be conducted for 12 days during the optimal survey period for adults (April 15 to July 15), with a maximum of 4 days per week and 8 days within any 30-day time period. At least one survey would be conducted for 4 consecutive days. In addition, surveys would be conducted for 5 days during the optimal survey period for hatchlings (August 1 to September 15).

If an area that may have suitable habitat has not been surveyed for BNLL, Interim Flows that could potentially inundate habitat would not be released in that area. No measures to avoid take of BNLL have been identified beyond withholding Interim Flows from reaches with identified habitat. Based on information gathered during BNLL surveys, avoidance measures would be identified as needed. If these avoidance measures are agreed on during consultation with USFWS, and implemented to fully avoid take of BNLL, WY 2010 Interim Flows could still be routed through areas with known BNLL habitat. If the surveys reveal presence of BNLL and no avoidance measures can be identified, agreed on, and implemented, WY 2010 Interim Flows would not be released into the Eastside or Mariposa bypasses.

Avoidance of Vernal Pools, Delta Button-Celery, and Alkali Sink Habitat in the Eastside and Mariposa Bypasses

The release of WY 2010 Interim Flows into the Eastside and/or Mariposa bypasses would depend on the ability to determine that flows would remain within the existing low-flow channel in the bypasses or otherwise would avoid inundating vernal pools, floodplain habitat occupied by Delta button-celery, or alkali sink habitat potentially suitable for palmate-bracted bird's-beak. Seepage and vegetation monitoring surveys during Interim Flow releases would be used to determine whether Interim Flows need to be reduced to avoid impacts to these species' habitats.

Invasive Species Management and Monitoring Plan

Within accessibility constraints associated with privately owned lands, comprehensive surveys for invasive nonnative plants will be conducted prior to and following the WY 2010 Interim Flow period during 2009, and 2010 or 2011. At sites where removal are implemented (if any), additional monitoring will be conducted for two years following removal. Survey results and removal will be documented in an Annual Invasive Species Monitoring and Management Report prepared no later than December 31 of each monitoring year.

These surveys will be conducted along the route of the WY 2010 Interim Flows down the mainstem San Joaquin River, between Friant Dam and the Merced River, and the bypass system. Surveys of all publicly accessible lands, Federal or State properties, and properties accessible by collaborating local agencies will be conducted. Instead of additional 2010 surveys, existing survey data may be used for areas previously surveyed during 2008 or 2009.

Surveys will record the distribution of the five invasive species that have been identified as the primary invasive species with potential to compromise the successful implementation of the SJRRP, and that could increase their distribution substantially because of SJRRP operations: giant reed (*Arundo donax*), sponge plant (*Limnobium spongia*), Chinese tallow (*Sapium sebiferum*), red sesbania (*Sesbania punicea*), and salt cedar (*Tamarix* species).

Any new infestations of these species downstream of the extent of the previously known infestations will be controlled and managed. Removal will be species-specific and will also depend on the size of the plants and of the infestation, and may include mechanical removal and limited chemical treatment by hand application. Potential treatments could include the following:

- Red sesbania infestations of a small number of plants (e.g., up to 20 plants) could be removed by mechanical means (hand pulling). Larger infestations of red sesbania could be hand-sprayed with a glyphosate formulation approved for aquatic applications.
- Infestations of giant reed could be controlled by cutting and removing stems, and by hand-treating the plants, or cut or frilled stems, with glyphosate applications.
- Infestations of salt cedar could be hand-treated using chemical control (e.g., imazapyr).
- Treatment of Chinese tallow would depend on plant size. Poles and mature plants could be cut and removed, and stumps could be hand-treated with glyphosate. Seedlings and saplings could be hand-treated directly with glyphosate.
- Infestations of sponge plant could be controlled by mechanical means.

No more than 10 separate vegetation removal crews will operate on any given day for a period of no more than 3 months. Crews may be outfitted with hand tools, chainsaws, and weed whackers. Each crew could employ one heavy piece of equipment (e.g., bobcat or backhoe) and/or one haul truck.

The Proposed Action (including implementation of environmental commitments), would not exceed USEPA's general conformity *de minimis* thresholds or hinder the attainment of air quality objectives in the local air basin. Prior to and during vegetation removal activities that utilize large equipment, fugitive dust emissions would be monitored to determine the need to implement fugitive dust control measures required under San Joaquin Valley Air Pollution Control District (SJVAPCD) Regulation VIII: Fugitive PM10 Prohibitions.

All treated sites will be visited 1 year after the initial treatment, and treated again if necessary. If treated again, the site will be revisited one additional time during the following year and treated a third time, if necessary.

Any herbicide applications will comply with all requirements specified on the product label. Use also will be limited as recommended in the applicable U.S. Environmental Protection Agency interim-measures bulletin for protection of endangered species.

4.0 Environmental Baseline

4.1 Historical Conditions

Typical of Central Valley rivers and a semiarid climate, the natural or “unimpaired” flow regime of the San Joaquin River historically varied greatly in the magnitude, timing, duration, and frequency of streamflows, both interannually and seasonally. Variability in streamflows created conditions that partially helped sustain multiple salmonid life history trajectories, as well as life history phases of numerous resident native fish species and other aquatic species.

The frequency and distribution of habitat types and microhabitat features present in the San Joaquin River before construction of Friant Dam were substantially different from those currently found in the river. In the reach downstream from the current location of Friant Dam, braided channels and side channels were likely very important spawning areas and provided high-quality rearing habitat for fry and juveniles (McBain and Trush 2002). In the unconfined valley reaches, the river flowed through an extensive flood basin that was frequently subject to prolonged inundation, particularly during the spring snowmelt-runoff period.

This description of historic conditions for the three major tributaries of the San Joaquin River – the Merced, Tuolumne, and Stanislaus rivers – is based on reconstructions developed for the Tuolumne River by McBain and Trush (2000). The Tuolumne is the largest of the three main San Joaquin River tributaries, but conditions in all three were likely broadly similar because the tributaries are geographically close and drain geologically and hydrologically similar watersheds. Because of dams, the lower sections of these rivers are the only portions still accessible to anadromous salmonids today.

The natural flow regimes of the Merced, Tuolumne, and Stanislaus rivers historically resulted in much greater variation in the magnitude of streamflows than the current regulated flow regimes. In the Tuolumne River, flow within a given year and between years varied from as little as 100 cfs in summer to peak winter floods exceeding 100,000 cfs. Before flows and sediment were regulated, the lower sections of the rivers behaved alluvially; the channel bed and banks were composed of gravel, cobble, and boulders, and the flow regime and sediment supply were adequate to form and maintain the bed and bank morphology. Before flows were regulated, variability in hydrologic and geological controls, as well as large floods, bedload transport, and channel migration, created dynamic, complex local channel morphologies and diverse riparian vegetation. These processes consistently renewed and maintained high-quality aquatic and terrestrial habitat in the lower reaches of the Merced, Tuolumne, and Stanislaus rivers.

In the lowermost sections of these tributaries, riparian corridors were miles wide. These corridors were sand-bedded and supported lush riparian vegetation. Diversity in plant communities was maintained by a dynamic interaction between initiation, maturation, and mortality of plant stands.

Upstream from the Merced River confluence, natural streambanks along the mainstem San Joaquin River were poorly developed because sediment loads were relatively low, which led to development of vast tule marshes along the river (McBain and Trush 2002). Habitat conditions along the mainstem San Joaquin River downstream from the Merced River confluence, however, were likely similar to those of the lowermost sections of the three primary tributaries. The Merced, Tuolumne, and Stanislaus rivers supplied the sediments required for the formation of relatively stable low- and high-flow channels in the downstream stretch of the San Joaquin River. Those natural streambanks helped provide the conditions required for development of riparian forests like those on the lower sections of the tributaries. Downstream from the Stanislaus River confluence, as the San Joaquin River approached the Delta, extensive tule marsh again bordered the river.

Water quality in the San Joaquin River and its tributaries has changed dramatically in many locations. Although historic water quality data (i.e., data from before construction of Friant Dam) are not available, the rivers presumably provided excellent water quality conditions for native fish, including anadromous salmonids. Cold, clear snowmelt runoff flowing from the granitic upper basins of the southern Sierra Nevada provided optimal conditions for freshwater life-history stages of salmonids in the upper San Joaquin River and its tributaries, and for invertebrate production, the primary food resource for salmonids. The abundant cold water in the upper San Joaquin River basin presumably had high (saturated) concentrations of dissolved oxygen (DO), low salinity, and neutral pH levels. Levels of suspended sediment and turbidity were likely low, even during high-runoff events, because of the upper basin’s mainly granitic geology and the relatively low rates of primary productivity (algae growth).

The Delta is a 600-square-mile area of channels and islands at the confluence of the Sacramento and San Joaquin rivers (Lund et al. 2007). Freshwater draining from a 41,300-square-mile watershed enters the Delta from the Sacramento and San Joaquin rivers and several smaller rivers. This Delta is fundamentally different from other river deltas because it was not formed primarily from deposition of river sediments, but from a combination of river sediments and vast quantities of organic matter deposited by tules and other marsh plants. Accumulation of both types of sediments has kept pace with a slow rise in sea level over the past 6,000 years.

The historical Delta consisted of low-lying islands and marshes. As originally found by European explorers, nearly 60 percent of the Delta was submerged by daily tides, and spring tides could submerge it entirely. Although most of the Delta was a tidal wetland, the water within the interior remained primarily fresh. However, inflow to the Delta from its major tributaries was much more variable than the current regulated flow regime, and salinity intruded much farther inland in the Delta during summer in some years. Inflow in winter and spring was generally higher than under current conditions.

About 350,000 acres of freshwater marsh were present in the Delta before land reclamation efforts began soon after the start of the Gold Rush. The dominant vegetation was tules, but a variety of tree species were established on the natural levees, including oak, sycamore, alder, walnut, and cottonwood.

4.2 Current Conditions

The lower San Joaquin River and the valley sections of its major tributaries—the Merced, Tuolumne, and Stanislaus rivers—have changed dramatically since the early part of the 19th century. These rivers are now largely confined within constructed levees and bounded by agricultural and urban development, flows are regulated by dams and water diversions, and floodplain habitats have been fragmented and reduced in size and diversity (McBain and Trush 2002). As a result, the riparian communities have substantially changed from historic conditions (McBain and Trush 2000, Jones and Stokes Associates 1998a). The presence of Friant Dam on the San Joaquin River and a series of dams on the eastside tributaries reduce the frequency of scouring flows, which has resulted in a gradual decline of bare gravel and sandbar surfaces required to recruit growth of new riparian plants.

The largest dam on the Merced River is New Exchequer Dam, which forms Lake McClure (1 million acre-feet) (USFWS 1995). Downstream from Exchequer Dam is Crocker-Huffman Dam, which prevents further upstream migration of fall-run Chinook salmon. The valley section of the Merced River is characterized by abandoned floodplain terraces (USFWS 2001), which have been developed for agricultural uses, such as row crops, cattle grazing, and orchard crops. Because riparian vegetation has been removed to facilitate these agricultural practices, only a narrow strip of riparian vegetation remains along the incised river channel. The riparian habitat and floodplain have been further disturbed by intensive aggregate mining.

The largest reservoir on the Tuolumne River is New Don Pedro Reservoir (2.0 million acre-feet) (USFWS 1995). Several small reservoirs lie downstream from this reservoir, the lowermost of which is Modesto Reservoir. LaGrange Dam, immediately downstream from Modesto Reservoir, is the upstream barrier to migration of fall-run Chinook salmon. Mining activities and urban and agricultural encroachment on the Tuolumne directly removed large tracts of riparian vegetation, and selective grazing by livestock removed young riparian plants. Regulation of flow and sediment indirectly affected riparian vegetation by modifying the hydrologic and fluvial processes required for a dynamic riparian ecosystem.

The largest dam on the Stanislaus River is New Melones Dam (2.4 million acre-feet) (USFWS 1995). Goodwin Dam, downstream from New Melones, is the upstream barrier for fall-run Chinook salmon migration on the Stanislaus River. Alteration of the natural flow regime and changes in land use practices similar to those described for the Merced and Tuolumne rivers have adversely affected environmental conditions in the lower Stanislaus River.

Delta habitat has been severely affected by the cumulative effect of many past and present actions. More than 95 percent of the Delta's original tidal marshes have been leveed and filled, resulting in losses of aquatic habitat (USGS 2007). The current Delta consists of islands, generally below sea level, that are surrounded by levees to keep water out. Inflow of freshwater into the Delta has been substantially reduced by water diversions, mostly to support agriculture. Dredging and other physical changes have altered flow patterns and salinity (USGS 2007).

The south Delta is perhaps the most degraded portion of the Delta because of large water diversions at Federal and State export facilities located in this region, greatly reduced inflow from the San Joaquin River, and high levels of contaminants from agricultural drainage. Nonnative species have changed and are continually changing the Delta's ecology by altering its food webs. All of the habitat changes have had substantial effects on the Delta's biological resources, including marked declines in the abundance of many native fish and invertebrate species (Greiner et al. 2007). Native fish species in decline include delta smelt, green sturgeon, Central Valley fall-run and spring-run Chinook salmon, Sacramento River winter-run Chinook salmon, and Central Valley steelhead.

4.3 Habitat Types in the Action Area

4.3.1 Aquatic Habitat Types

The Action Area encompasses a large variety of aquatic habitats. A 9-mile reach of the San Joaquin River stretches upstream from Millerton Lake to Kerckhoff Dam. This section of river has a bedrock-constrained channel with alternating long, narrow pools and small cascades, poorly developed riparian vegetation, and flow managed by diversions and releases from Kerckhoff Dam. Millerton Lake does not contain any listed aquatic species so is not discussed further in this section.

The section of San Joaquin River between Friant Dam and the Merced River confluence (i.e., SJRRP Reaches 1A through 5) provides generally poor fish habitat conditions. Physical barriers, reaches with poor water quality or no surface flow, and the presence of false migration pathways have reduced habitat connectivity. Habitat complexity between Friant Dam and the confluence with the Merced River is reduced, with limited side-channel habitat or instream habitat structure, and highly altered riparian vegetation. In upstream portions, gravel mining has created pits that provide lentic habitat that may be used by piscivorous species. Bypasses in these reaches receive water sporadically, as necessary for flood control. Most aquatic habitat in the bypasses is therefore temporary, and its duration depends on flood flows; the bypasses are largely devoid of aquatic and riparian habitat because of efforts to maintain hydraulic conveyance for flood flows (McBain and Trush 2002).

Aquatic habitats in the Tuolumne River downstream from LaGrange Dam are influenced by several factors, many of them related to former gold mining activities and gravel mining (McBain and Trush 2000). A 10-mile stretch of the Tuolumne River channel downstream from the dam is constrained by extensive fields of dredge tailings that range from large cobbles to fine sediments, which restrict river meander and access to alluvial sediments. Downstream, the lower gradient river meanders through low hills and valleys bordered by grazing land, tree crops, and irrigated fields of row crops. At approximately 25 miles below La Grange Dam, the river is generally channelized and flows through sandy loam soils. In this lower reach, the Tuolumne River channel is characterized by slow-velocity run habitat with a sandy-silty bottom and no riffles; the area is not suitable for salmonid spawning.

The Merced River is accessible to anadromous fish for the first 51 river miles upstream from the San Joaquin River confluence, with access terminating at Crocker-Huffman Dam (USFWS 2001). Most spawning occurs within a few miles of the dam. In the Stanislaus River, fall-run Chinook salmon spawn in a 23-mile stretch of the Stanislaus downstream from Goodwin Dam, but most spawning occurs in the first 10 miles below the dam.

Habitat conditions in the lower San Joaquin River downstream from the Merced River confluence are similar to those described above for the lowermost section of the Tuolumne River. The river channel is characterized by slow-velocity run habitat with a sandy-silty bottom and no riffles. Riparian habitat is poorly developed. Diversions are numerous in this section, providing water for agricultural and municipal use; some of the applied water is returned as agricultural drainage (Brown and May 2006).

The downstream-most portion of the Action Area is the Delta, which provides highly modified estuarine habitat. Little remains of the Delta's tidal marshes that once provided vast amounts of aquatic habitat. Current habitat consists primarily of a complex network of interconnected and leveed channels. Vegetation on the levees of some channels provides suitable riparian habitat, but other levees are armored with riprap, which has little value for fisheries habitat. Water development projects have greatly altered the seasonal magnitude, timing, and direction of flows in the Delta, which has adversely affected native species and may have facilitated successful invasions by numerous exotic species. Exotic species currently dominate the Delta's biotic community.

The Delta is a tidal region, and every 12.4 hours, the tides cause water to move in and out of the Delta (USFWS 2008). Most of the time, tides cause a 5- to 8-mile ebb-and-flow movement of water in the western part of the Delta. The movement of freshwater through the Delta is superimposed on the tidal flows. Typical freshwater flows are much smaller than tidal flows, usually in the range of 5 to 15 percent of the tidal flows. Along a salinity gradient extending from San Francisco Bay into the Delta, the species composition of the aquatic community changes dramatically, although the basic functional relationships among organisms (e.g., predator/prey) remain similar throughout the system.

4.3.2 Terrestrial Habitat Types

The regional vegetation and land cover types are shown in Exhibits 1a-1c.

Millerton Lake and Upper San Joaquin River to Kerckhoff Dam

Plant communities around Millerton Lake are mostly foothill woodlands and grassland, with minor inclusions of willow scrub along the shoreline and riparian forest communities where intermittent drainage channels empty into the lake. Adjacent hillsides support foothill pine–blue oak woodland with abundant grass/forb and shrub understory. Open grassland and savanna-type habitat conditions also exist in some areas. Several large basalt tables known to have vernal pools surround the canyon, well above an elevation of 1,600 feet.

Upland vegetation above Millerton Lake is characterized by foothill pine–oak woodland with areas of open grassland and rock outcroppings. The predominant vegetation is foothill pine, blue oak, and interior live oak. Montane coniferous forest constitutes the higher elevations upstream from Mammoth Pool. Habitat types in this area are meadow, riparian deciduous, lodgepole pine, mixed conifer, ponderosa pine, rock outcrop, and brush (USJRWPA 1982).

San Joaquin River from Friant Dam Downstream to Merced River

Reach 1. Steep bluffs confine the riparian zone for much of Reach 1A (DWR 2002). Reach 1A presently supports continuous riparian vegetation, except where the channel has been disrupted by instream aggregate removal or off-channel aggregate pits that have been captured by the river. This subreach has the highest overall diversity of plant species in the Restoration Area and greatest number of riparian communities: cottonwood, willow, mixed, and oak riparian forest; willow and riparian scrub and elderberry savanna; and emergent wetland (DWR 2002). Large areas occupied by invasive tree species (blue gum and tree-of-heaven) have been recorded in Reach 1A. Giant reed and red sesbania were also recorded (DWR 2002).

Reach 1B is more narrowly confined by levees. Outside of the levees and steep bluffs, land uses are nearly all agricultural. Woody riparian vegetation is prevalent and occurs mainly in narrow strips immediately adjacent to the river channel. Mature vegetation on the backside of many point bars and on low floodplains is scarce. Remnant valley oaks are present on some of the higher terraces. Previously cleared terraces and the understory of the cottonwood and oak stands are dominated by nonnative annual grasses (McBain and Trush 2002). Blue gum, giant reed, red sesbania, and tree-of-heaven are prevalent in Reach 1B. Red sesbania was mapped downstream to River Mile (RM) 242 in 2000, but likely is currently more abundant downstream given its potential to spread rapidly (DWR 2002).

Reach 2. Reach 2 of the San Joaquin River is characterized by seasonal drying of the channel in summer and fall. The water table recedes into the porous substrate, creating a pronounced riparian drought nearly every year (DWR 2002). In most years, the channel is essentially dry most of the year from Gravelly Ford to the Mendota Pool, except under flood release conditions, when up to 2,000 cfs is passed downstream from the Chowchilla Bifurcation Structure (Jones and Stokes Associates 1998b). Cultivated lands occupy nearly all the lands outside the river bottom.

Riparian vegetation in the upper 10 miles of this reach (Reach 2A) is sparse or absent because the river is usually dry and the shallow groundwater is overdrafted (McBain and Trush 2002). Grassland and pasture are relatively abundant in Reach 2A, contributing almost 50 percent to the total natural land cover (excluding urban and agricultural land cover types). The most abundant riparian communities present are riparian and willow scrub habitats. The only significant stand of elderberry savanna mapped in the Restoration Area occurs on the left bank near the Chowchilla Bifurcation Structure, at the junction of Reaches 2A and 2B (DWR 2002). Invasive species recorded in Reach 2A in 2000 included large stands of blue gum and tree-of-heaven (9 acres) and giant reed (6 acres) (DWR 2002). Red sesbania is also widespread in Reach 2A, based on observations made in 2008.

The lower few miles of Reach 2B support narrow, patchy, but nearly continuous vegetation because this area is continuously watered by the backwater of the Mendota Pool. The riparian zone is very narrowly confined to a thin strip 10 to 30 feet wide bordering the channel. The herbaceous understory, however, is very rich in native species, and a high portion of the total vegetative cover is native plants. Invasive species were not mapped in Reach 2B by DWR (2002).

The margins of the Mendota Pool support some areas of emergent vegetation dominated by cattails and tules; a few cottonwoods and willows grow above the waterline.

Reach 3. San Joaquin River Reach 3 is characterized by continuous flow from the Delta-Mendota Canal within a very confined channel, by seasonally low water, and by narrow strips of riparian vegetation along the river's edge. Adjacent lands are mostly in agricultural use, except where the city of Firebaugh borders the river's west bank for 3 miles. The likely reason that the riparian corridor is narrow is that the upper and middle floodplain elevations have been developed for agricultural and urban uses. A reduction in the frequency of lower flood events also likely resulted in less frequent scouring, which has decreased the abundance of early successional riparian vegetation (i.e., scrub) and riverwash (Jones and Stokes Associates 1998b), while allowing the establishment of riparian forest.

Nearly continuous riparian vegetation of various widths and cover types occurs on at least one side of the channel in this reach. In Reach 3, cottonwood riparian forest is the most abundant native vegetation type, followed by willow scrub, willow riparian forest, and riparian scrub. Small amounts (less than 0.5 acre each) of giant reed and nonnative trees were mapped in Reach 3 (DWR 2002).

Reach 4. Reach 4A San Joaquin River is similar to Reach 3 in that the flow is confined within a narrow channel and agricultural land borders the levees. The flows in this subreach are usually negligible because of the diversion at Sack Dam, but periodically flood-control flows are conveyed in such a way as to define a channel through the reach (Jones and Stokes Associates 1998b). The floodplain of the Reach 4B is broader, with levees set back from the active channel. The water table is also closer to the surface than in the other reaches within the Restoration Area (DWR 2002).

Reach 4A is sparsely vegetated, with a very thin band of vegetation along the channel margin (or none at all). Willow scrub and willow riparian forest occur in small to large stands, and ponds rimmed by small areas of marsh vegetation are present in the channel; however, this reach has the fewest habitat types and lowest ratio of natural vegetation per river mile in the Restoration Area.

Reach 4B upstream from the Mariposa Bypass (Reach 4B1) supports a nearly unbroken, dense, but narrow corridor of willow scrub or young mixed riparian vegetation on most of the reach, with occasional large gaps in the canopy. Reach 4B1 no longer conveys flows because the Sand Slough Control Structure diverts all flows into the bypass system. As a result, the channel in Reach 4B1 is poorly defined and filled with dense vegetation, and in some cases, is plugged with fill material.

Because of its wider floodplain and available groundwater, as well as management of the land as part of the San Luis NWR, Reach 4B2 contains vast areas of natural vegetation compared to the upstream reaches. Grasslands and pasture are the most common vegetation type, but willow riparian forest and emergent wetlands are also relatively abundant. Agricultural land uses are greatly reduced relative to other reaches in the Restoration Area (DWR 2002).

Reach 5. Conditions in Reach 5 of the San Joaquin River are similar to conditions in Reach 4B2: The floodplain is broad, less agricultural conversion of natural habitat has occurred than elsewhere in the Restoration Area, and land is held in public ownership and managed for wildlife habitat. The river has more sinuosity in this reach and oxbows, side channels, and remnant channels are present; however, the floodplain and basin are generally disassociated from the mainstem river because of levees constructed as part of the San Joaquin River Flood Control System (McBain and Trush 2002).

In Reach 5, the San Joaquin River is surrounded by large expanses of upland grassland, with substantial woody riparian vegetation in the floodplain. Remnant riparian tree groves are concentrated on the margins of mostly dry secondary channels and depressions or in old oxbows. Along the mainstem San Joaquin River, a relatively uniform pattern of patchy riparian canopy hugs the channel banks as large individual trees or clumps (primarily valley oaks or black willow) with a mostly grassland or brush understory (McBain and Trush 2002).

The most abundant plant community is grassland and pasture, followed by willow riparian forest, emergent wetland, willow and riparian scrub, and willow, oak, and cottonwood riparian forests. Alkali scrub is also present in this reach (DWR 2002).

Eastside and Mariposa Bypasses

Eastside Bypass. Upland vegetation in the Eastside Bypass is grassland and ruderal vegetation (i.e., nonnative herbaceous of disturbed lands). The reach between the Sand Slough Control Structure and the Merced NWR (approximately 4.5 miles) supports several ponds. For the next 2.2 miles, the bypass moves through the Merced NWR, which encompasses more than 10,000 acres of wetlands, native grasslands, vernal pools, and riparian habitat. Farther downstream, the Eastside Bypass passes through the Grasslands Wildlife Management Area, an area of private lands with conservation easements held by USFWS, and through the East Bear Creek Unit of the San Luis NWR Complex. Patchy riparian trees and shrubs occur along the banks of the Eastside Bypass in these areas. Side channels and sloughs (e.g., Duck, Deep, and Bravel sloughs) are present along the lower Eastside Bypass, and some support remnant patches of riparian vegetation.

Mariposa Bypass. The Mariposa Bypass is bordered to the south by agricultural land and vernal pool grasslands to the north. Scattered riparian trees are present along the Mariposa Bypass.

San Joaquin River Downstream from the Merced River Confluence

The San Joaquin River downstream from the Merced River confluence is similar to the river upstream from the confluence, except that the Merced, Tuolumne, and Stanislaus rivers contribute a substantial amount of flow in this area. The upstream portion of the San Joaquin River below the Merced River is more incised than the downstream portion, with generally drier conditions in the riparian zone and a less developed understory.

Agricultural land use has encroached on the riparian habitat along most of the San Joaquin River. Along much of the river, only a narrow ribbon of riparian habitat is supported. However, riparian habitat is more extensive locally, especially near the confluence with tributary rivers, within cutoff oxbows, and in the 6,500-acre San Joaquin River NWR between the confluences with the Tuolumne and Stanislaus rivers. Remnant common tule- and cattail-dominated marshes may occur at these areas.

South Delta

Agriculture dominates the Delta area, with agricultural lands occupying nearly three-quarters of the region’s total land area (CALFED 2000). However, a substantial area of natural vegetation remains, including large areas of sensitive riparian, marsh, and aquatic vegetation, which are described below.

Most riparian vegetation in the Delta is characterized by narrow linear strips of trees and shrubs, in single-story to multistory canopies. Tree canopies may be continuous, discontinuous, or absent altogether (as in riparian scrub). These patches of riparian vegetation typically are on or at the toe of levees. Riparian communities in this region include cottonwood-willow woodland, valley oak riparian woodland, riparian scrub, and willow scrub.

In addition to the wetland communities described for the San Joaquin River, the Delta supports tidal freshwater and brackish-water emergent marshes that, like nontidal marshes, are dominated by clonal perennial plants. This community occurs on instream islands and along most tidally influenced waterways. In addition to the environmental factors affecting marshes outside of the Delta, the species composition of tidal marshes in the Delta is affected by regional salinity gradients.

The Delta supports extensive areas of aquatic vegetation. These communities consist of submerged plants generally rooted in the substrate, whose stems may extend partially above the water surface (e.g., during flowering) and floating plants that generally are not rooted in the substrate. The availability of light (which decreases with depth), turbidity, water velocities, and shade cast by overtopping vegetation can restrict submerged plants to relatively shallow areas. In the Delta (which has turbid waters), most submerged vegetation appears to be restricted to areas less than 5 to 10 feet deep.

Merced, Tuolumne, and Stanislaus Rivers
As mentioned previously, three major rivers are tributary to the San Joaquin River: the Merced, the Tuolumne, and the Stanislaus. These rivers were evaluated for habitat from the respective dam sites to the confluence with the San Joaquin River: the Merced River downstream from New Exchequer Dam, the Tuolumne River downstream from Don Pedro Dam, and the Stanislaus River downstream from New Melones Dam. These rivers originate in the Sierra Nevada foothills and are generally surrounded by foothill pine–oak woodland with an herbaceous understory. As the rivers reach the floor of the Central Valley, the riparian corridor is narrower because of urban development and agricultural land uses.

Along the Merced River, near the community of Snelling, dredge spoils line the river. The dredge spoils support seasonal scrub–shrub wetlands in the concave areas between spoils. Downstream, a wide wash is present along the Merced River floodplain; this area is devoid of woody vegetation, and two oxbow lakes are present in this area. Dredge spoils are also present along the Tuolumne River, near the community of La Grange. The dredge spoils in this location support forested wetlands throughout the spoils area. In addition, dredge spoils are present along the Stanislaus River and support a forested wetland habitat.

4.4 Current Management Direction

The WY 2010 Interim Flows have been developed around existing and ongoing Federal, State, and local efforts intended to protect Federally listed and proposed species within the Action Area. Consultation with USFWS and NMFS regarding the potential effects of the WY 2010 Interim Flows is based on the ESA policy for each resource agency, existing BOs, and other guidance documents and programs as described below.

4.4.1 Central Valley Project Improvement Act
CVPIA amends the authorization of the CVP to include fish and wildlife protection, restoration, and mitigation as project purposes of the CVP having equal priority with irrigation and domestic uses of CVP water and elevates fish and wildlife enhancement to a level having equal purpose with power generation. Under the CVPIA, a significant goal identified to meet the new fish and wildlife purposes is the broad goal of restoring natural populations of anadromous fish (Chinook salmon, steelhead, green and white sturgeon, American shad and striped bass) in Central Valley rivers and streams to double their recent average levels.

4.4.2 Anadromous Fish Restoration Program
The Anadromous Fish Restoration Program (AFRP) was developed to comply with Section 3406(b)(1) of the CVPIA. The Secretary of the Interior was directed to:

> *"…develop within three years of enactment and implement a program which makes all reasonable efforts to ensure that, by the year 2002, natural production of anadromous fish in Central Valley rivers and streams will be sustainable, on a long-term basis, at levels not less*

> *than twice the average levels attained during the period of 1967–1991…"*

Additionally, Section 3406(b)(1) jointly imparted the responsibilities of implementing the CVPIA to the USFWS and Reclamation although the USFWS has assumed the lead role in the development of the AFRP. The Final Restoration Plan for the AFRP was adopted on January 9, 2001 and will be used to guide the long-term development of the AFRP.

4.4.3 Long-term Central Valley Project and State Water Project Operations Criteria and Plan

The CVP and the SWP are two major inter-basin water storage and delivery systems that divert and re-divert water from the southern portion of the Delta. Both CVP and SWP include major reservoirs upstream of the Delta, and transport water via natural watercourses and canal systems to areas south and west of the Delta. The CVP also includes facilities and operations on the Stanislaus and San Joaquin rivers. The major facilities on these rivers are New Melones and Friant Dams, respectively.

The projects are permitted by the California State Water Resources Control Board (SWRCB) to store water during wet periods, divert water that is surplus to the Delta, and re-divert CVP/SWP water that has been stored in upstream reservoirs. Both CVP and SWP operate pursuant to water right permits and licenses issued by the SWRCB to appropriate water by diverting to storage or by directly diverting to use and re-diverting releases from storage later in the year. As conditions of their water right permits and licenses, the SWRCB requires the CVP and SWP to meet specific water quality, quantity, and operational criteria within the Delta. Reclamation and DWR closely coordinate the CVP and SWP operations, respectively, to meet these conditions.

Because the CVP and SWP operations, including export activities, affect fish and wildlife in the Central Valley, Reclamation consulted with both USFWS and NMFS under Section 7 of the ESA. The most recent consultation has been completed with USFWS for delta smelt (BO published in 2008). NMFS is currently preparing their BO for Sacramento River winter-run Chinook salmon ESU, Central Valley spring-run Chinook salmon ESU, Central Valley steelhead DPS, and North American green sturgeon, with the expected release date in June 2009.

4.4.4 CALFED Bay-Delta Program

CALFED consists of a consortium of Federal and State agency personnel working together to protect the San Francisco Bay/Sacramento-San Joaquin Delta, coordinate CVP and SWP operations, and develop a long-term Bay-Delta solution to address ecosystem restoration. A major element of the CALFED Bay Delta Program is the Ecosystem Restoration Program Plan that is intended to provide the foundation for long-term ecosystem and water quality restoration and protection throughout the region.

4.4.5 Coordinated Operations Agreement

The 1986 Agreement Between the United States of America and the DWR for Coordinated Operation of the CVP and SWP (COA) defines the rights and responsibilities of the CVP and SWP with respect to in-basin water needs and provides a mechanism to measure and account for those responsibilities. In-basin uses are defined in the COA as legal uses of water required under SWRCB Decision 1485 (D-1485), Delta Standards. Since both the CVP and SWP utilize the Delta as common conveyance facilities, reservoir releases and Delta export operations must be coordinated to ensure that the CVP and SWP each retains its share of the commingled water and each bears its share of the joint obligations to protect beneficial uses.

Balanced water conditions are defined in the COA as periods when it is agreed that releases from the upstream reservoirs, plus unregulated flows, approximately equals the water supply needed to meet Sacramento Valley in-basin demands plus exports. Excess water conditions are periods when sufficient water is available to meet all beneficial needs, and the CVP/SWP are not required to make releases from reservoir storage. When water must be withdrawn from reservoir storage under the COA, the CVP is responsible for providing 75 percent and the SWP 25 percent of the water to meet Delta Standards. When unstored water is available for export (i.e., under balanced conditions), and the sum of CVP stored water, SWP stored water, and the unstored water for export is allocated at 55/45 percent to the CVP and SWP, respectively.

The COA has evolved considerably since 1986 with changes to facilities and operating criteria. New flow standards such as those imposed by the SWRCB have revised how projects are operated. Although the burden of meeting these new responsibilities has been worked out internally between the CVP and SWP, the COA has never been officially amended or evaluated for consistency. Previous NMFS BOs have evaluated operations with the internal changes that have taken place in the COA to date.

4.4.6 Recovery Plan for Sacramento-San Joaquin River Delta Native Fishes

In 1996, USFWS released a Recovery Plan for Sacramento-San Joaquin River Delta Native Fishes (USWFS 1996) that included recovery plans for delta smelt, spring-run Chinook salmon, San Joaquin River fall-run Chinook salmon and green sturgeon. The objective of the Recovery Plan is to establish self-sustaining populations of the fishes that will persist indefinitely.

4.4.7 Watershed Protection Program

In 1997, the Watershed Restoration and Protection Council (WRPC) program was established and is composed of all California agencies that have programs addressing anadromous salmonid protection and restoration. The WRPC is charged with overseeing all State activities aimed at watershed protection and enhancement, and directing the development of a Watershed Protection Program that provides for anadromous salmonid conservation in California (http://ceres.ca.gov/watershed/wprc/Final_WPRC_Report.pdf).

4.4.8 Habitat Conservation Plans

NMFS and USFWS are currently assisting in the development of multiple species habitat conservation plans (HCP) for State and privately owned lands. HCPs, which are required under Section 10 of the Federal ESA, address species protection under non-Federal projects. The purpose of the HCP is to ensure that any incidental taking of listed species will not appreciably reduce the likelihood of species survival.

4.4.9 Clean Water Act and Rivers and Harbors Act

Projects requiring a permit from the United States Army Corps of Engineers (USACE), under Section 10 of the Rivers and Harbors Act of 1899 and Section 404 of the Clean Water Act (CWA), do not allow the extent of destruction and modification of sensitive species' habitat that occurred prior to the implementation of these regulations. Measures to protect sensitive species are often included as "standard measures" in Section 404 permits. Examples of these measures include eliminating or reducing siltation by installing silt fencing along project sites and access roads, preventing sensitive species from entering the Project Area, erecting cofferdams on either side of project sites, and timing project activities to reduce impacts during the breeding season.

4.4.10 Pacific Coast Salmon Fishery Management Plan

The Pacific Fishery Management Council (PFMC) regulates the offshore sport and commercial fishery for Chinook salmon using its Pacific Coast Salmon Fishery Management Plan (PFMC 2003), which describes the goals and methods for salmon management. Management tools, such as season length, quotas, bag limits, and gear restrictions, vary annually, depending on how many salmon are present. There are two main components to the Plan: (1) an annual goal for the number of spawners of the major salmon stocks ("spawner escapement goals") and (2) allocation of the harvest among different groups of anglers (commercial, recreational, tribal, various ports, ocean, and inland). PFMC must also comply with laws such as the ESA.

4.4.11 California Endangered Species Act

The California Endangered Species Act (CESA) of 1984 allows DFG administers to protect fish and wildlife resources by regulating the listing and "take" of endangered and threatened species. A "take" of such a species may be allowed by DFG through issuance of permits pursuant to Fish and Game Code Section 2081. DFG is empowered to review projects for their potential impacts to listed species and their habitats.

The CESA is similar to the Federal ESA but pertains only to State-listed endangered and threatened species. The CESA requires State agencies to consult with DFG when preparing documents under CEQA to ensure that the actions of the State lead agency do not jeopardize the continued existence of listed species. The CESA directs agencies to consult with DFG on projects or actions that could affect listed species, directs DFG to determine if jeopardy to listed species would occur, and allows DFG to identify "reasonable and prudent alternatives" to the project consistent with conserving the species. Agencies can approve a project that affects a listed species if the agency determines that there are "overriding considerations"; however, the agencies are prohibited from approving projects that would cause the extinction of a listed species. The CESA prohibits the "take" of State-listed as endangered or threatened plant and wildlife species. DFG may authorize take if there is an approved habitat management plan or management agreement that avoids or compensates for impacts on listed species.

4.4.12 The Salmon, Steelhead Trout, and Anadromous Fisheries Program Act

The Salmon, Steelhead, Trout and Anadromous Fisheries Program Act was enacted in 1988. At that time, DFG reported that the natural production of salmon and steelhead in California had declined to approximately 1,000,000 adult Chinook salmon, 100,000 coho salmon, and 150,000 steelhead. In addition, DFG reported that the naturally spawning salmon and steelhead resources of the State had declined dramatically within the past four decades primarily as a result of lost stream habitat on many streams in the State. The Salmon, Steelhead Trout, and Anadromous Fisheries Program Act declares that it is the policy of the State to increase the salmon and steelhead resources, and directs DFG to develop a plan and program that strives to double the salmon and steelhead resources (Fish and Game Code Section 6900).

4.4.13 Steelhead Restoration and Management Plan of California

The goals for steelhead restoration and management outlined in Steelhead Restoration and Management Plan for California (DFG 1996) are: (1) to increase natural production, as mandated by The Salmon, Steelhead Trout, and Anadromous Fisheries Program Act of 1988, in an attempt to create self-sustaining steelhead populations and maintain them in good condition; and (2) to enhance opportunities for angling and non-consumptive uses.

The plan focuses on the restoring of native and wild stocks, as these stocks have the greatest value insofar as maintaining genetic and biological diversity. Suggested strategies to accomplish these two goals include restoring degraded habitat; restoring access to historic habitat that is currently blocked; reviewing angling regulations to ensure that steelhead adults and juveniles are not over-harvested; maintaining and improving hatchery runs, where appropriate; and developing and facilitating research to address deficiencies in information on fresh water and ocean life history, behavior, habitat requirements, and other aspects of steelhead biology.

4.4.14 Porter-Cologne Act

The Porter-Cologne Act, enacted in 1969 and amended in 2005, specifies requirements for water quality protection in California. Under the Porter-Cologne Act, California is required to adopt water quality policies, plans, and objectives that ensure beneficial uses of the State are reasonably protected. The SWRCB and the Regional Water Quality Control Boards (RWQCB) are the agencies with the primary responsibilities of water quality protection and Clean Water Act implementation in California. In their respective regions, the RWQCBs engage in several water quality functions. One of the most important is preparing and periodically updating water quality control plans, which specify the beneficial uses to be protected within a particular region. RWQCBs also regulate all pollutant or nuisance discharges that may affect either surface water or groundwater, including non-point source discharges to surface water. Additionally, the SWRCB, in acting on water rights applications, may establish terms and conditions in water rights permits to help implement water quality control plans.

5.0 Species Accounts

This section presents the status, habitat requirements, and the potential for occurrence of each of the species evaluated in this BA. In addition, critical habitat for each species is discussed if it has been designated and would be affected by the Proposed Action. Recovery and management actions important to the conservation of species are also summarized from existing recovery plans or other information when available.

5.1 Aquatic Species

Listed aquatic species protected under the ESA and described below are the Central Valley steelhead distinct population segment (DPS), delta smelt, Central Valley spring-run Chinook salmon, Sacramento River winter-run Chinook salmon, and the North American green sturgeon DPS.

5.1.1 Central Valley Steelhead Distinct Population Segment

The Central Valley steelhead DPS includes all naturally spawned populations of anadromous steelhead below natural and human-made impassable barriers in the Sacramento and San Joaquin rivers and their tributaries, excluding steelhead from San Francisco and San Pablo bays and their tributaries. This species also includes anadromous steelhead from two artificial propagation programs: the Federal Coleman Nimbus Fish Hatchery and State Feather River Fish Hatchery. Central Valley steelhead DPS are listed as threatened (71 *Federal Register* (FR) 834–862, January 5, 2006).

"Steelhead" is the term commonly used for the anadromous form of rainbow trout. NMFS considered including resident *Oncorhynchus mykiss* in listed steelhead DPSs in certain cases (63 FR 13347–13371, March 19, 1998):

- Where resident *O. mykiss* have the opportunity to interbreed with anadromous fish below natural or artificial barriers.

- Where resident fish of native lineage once had the ability to interbreed with anadromous fish but no longer do because they are currently above artificial barriers and are considered essential for the recovery of the DPS.

However, USFWS, which has authority over resident fish under the ESA, concluded that behavioral forms of *O. mykiss* can be regarded as separate DPSs, and that lacking evidence that resident rainbow trout need ESA protection, only anadromous forms should be included in the DPS and listed under the ESA. USFWS also did not believe that the recovery of steelhead would rely on the intermittent exchange of genetic material between resident and anadromous forms. In the final rule, the listing includes only the anadromous form of *O. mykiss* (NMFS 1998).

Moreover, NMFS considers all *O. mykiss* that have physical access to the ocean (including resident rainbow trout) to potentially be steelhead and will treat these fish as steelhead. Microchemical analyses of otoliths taken from rainbow trout in the San Joaquin River Basin have verified that the anadromous form of *O. mykiss* occurs in low numbers in the basin (Zimmerman, Edwards, and Perry 2008).

NMFS is in the process of preparing a recovery plan for all listed Central Valley salmon, including Central Valley steelhead. NMFS issued a recovery outline in 2007, which serves as an interim guidance document until the full recovery plan is released (NMFS 2007). The outline identifies the factors that have led to the decline of the Central Valley steelhead DPS, describes past conservation efforts, and provides a preliminary list of recommended recovery measures. The following measures have been identified for the protection of Central Valley steelhead:

- Conduct and improve monitoring and research on distribution, status, and trends.
- Protect and restore the complexity of watershed and estuarine habitat.
- Implement freshwater habitat restoration techniques as part of construction activities (e.g., setback levees/bar stabilization/levee repair and maintenance, reintroduction of instream woody material (IWM), erosion control).
- Reduce and control impacts of urbanization through education and outreach, partnerships, collaborative teams, and protective regulations.
- Screen water diversion structures in important/priority anadromous fish–bearing streams.
- Collaboratively balance water supply and allocation with the needs of fisheries by improving criteria for water drafting, storage and dam operations, and water rights programs; developing passive diversion devices and/or offstream storage; eliminating illegal diversions in priority watersheds and streams; and facilitating other such opportunities.
- Modify channel and flood control maintenance practices, where appropriate, to increase stream and riparian complexity.
- Identify and treat point- and nonpoint-source pollution to streams from wastewater, agricultural practices, and urban environments.

Historic and Current Distribution

The historic distribution of steelhead in the Central Valley is not known, but in rivers where the species still occurs, steelhead are normally more widely distributed than Chinook salmon (Voight and Gale 1998, cited in McEwan 2001; Yoshiyama et al. 1996). Steelhead are typically tributary spawners.

Lindley et al. (2006) predicted the historical distribution of steelhead, using an Intrinsic Potential habitat model. They found that at least 81 independent populations of *O. mykiss* were widely distributed throughout the Central Valley, but that populations were relatively less abundant in San Joaquin River tributaries than in Sacramento River tributaries because of natural barriers to migration. Also, many small tributaries to the major San Joaquin River tributaries have too high a gradient or too little flow to have supported *O. mykiss*; consequently, steelhead were likely restricted to the mainstems and larger tributaries (Lindley et al. 2006). Around 80 percent of the historical spawning and rearing habitat is now behind impassable dams, and 38 percent of the populations identified by the model have lost their entire habitat (Lindley et al. 2006).

Naturally spawning steelhead populations have been found in the upper Sacramento River downstream from Keswick Dam; in Mill, Deer, and Butte creeks; and in the Feather, Yuba, American, and Mokelumne rivers (McEwan 2001). The steelhead population in the San Joaquin River was extirpated; however, small populations of steelhead persist in the lower San Joaquin River tributaries (i.e., the Stanislaus and Tuolumne rivers and possibly the Merced River) (McEwan 2001). Naturally spawning populations may exist in many other streams but be undetected because of the lack of monitoring or research programs. Steelhead also rear in and migrate through the Delta.

Abundance Trends

NMFS has concluded that populations of naturally reproducing steelhead have been experiencing a long-term decline in abundance throughout their range. Populations in the southern portion of the range have experienced the most severe declines, particularly in streams from the Central Valley south, where many stocks have been extirpated (NMFS 1996a). Since the early 20th century, 23 naturally reproducing populations of steelhead are believed to have been extirpated in the western United States. Many more are thought to be in decline in Washington, Oregon, Idaho, and California. The decline of stocks in California has been particularly steep.

The historic run size of Central Valley steelhead is difficult to estimate given limited data, but may have approached 1 to 2 million adults annually; by the early 1960s, the steelhead run size had declined to about 40,000 adults (McEwan 2001). In the past 30 years, populations of naturally spawned steelhead in the upper Sacramento River have declined substantially. The number of adult steelhead in the Sacramento River upstream from the Feather River was estimated to average 20,540 through the 1960s (Hallock et al. 1961, NMFS 2008). Steelhead counts at Red Bluff Diversion Dam (RBDD) declined from an average of 11,187 for the period of 1967–1977 to an average of approximately 2,000 through the early 1990s, with an estimated total annual run size for the entire Sacramento–San Joaquin system, based on RBDD counts, of no more than 10,000 adults (McEwan 2001). Steelhead escapement surveys at RBDD ended in 1993 because of changes in dam operations (NMFS 2008).

The only consistent data available on steelhead numbers in the San Joaquin River basin come from DFG midwater trawling samples collected on the lower San Joaquin River at Mossdale. These data indicate that steelhead numbers declined in the early 1990s and remained low through 2002 (NMFS 2008). In 2004, a total of 12 steelhead smolts were collected at Mossdale. Population numbers of adult Central Valley steelhead present in the San Joaquin tributaries (Stanislaus, Tuolumne, and Merced rivers) are unknown.

Life History

Steelhead exhibit highly variable patterns throughout their range, but are broadly categorized into winter- and summer-run reproductive ecotypes. Winter-run steelhead, the most widespread reproductive ecotype, become sexually mature in the ocean, enter spawning streams in fall or winter, and spawn in winter or late spring (Meehan and Bjornn 1991, Behnke 1992). In the Sacramento River, juvenile steelhead generally emigrate as 2-year-olds (Hallock et al. 1961) in winter and spring (McEwan 2001). Emigration appears to be more closely associated with size than age; most downstream migrants measure 6–8 inches. Downstream migration in unregulated streams has been correlated with spring freshets (Reynolds et al. 1993).

Adult Upstream Migration and Spawning. In the Central Valley, adult winter-run steelhead migrate upstream during most months of the year. Upstream migration begins in June, peaks in September, and continues through February or March (Hallock et al. 1961, Bailey 1954, both as cited in McEwan and Jackson 1996). Spawning occurs primarily from January through March, but may begin as early as late December and may extend through April (Hallock et al. 1961, cited in McEwan and Jackson 1996). In the Central Valley, adult winter steelhead generally return at ages 2 and 3 and range in size from 2 to 12 pounds (Reynolds et al. 1993). Increased water temperatures may trigger movement, but some steelhead ascend into freshwater without any apparent environmental cues (Barnhart 1991).

Although most steelhead die after spawning, adults are capable of returning to the ocean and migrating back upstream to spawn in subsequent years. Runs may include 10 to 30 percent repeat spawners, most of which are females (Ward and Slaney 1988, Meehan and Bjornn 1991, Behnke 1992). Repeat spawning is more common in smaller coastal streams than in large watersheds that require a lengthy migration (Meehan and Bjornn 1991). Hatchery steelhead are typically less likely than wild fish to survive to spawn a second time (Leider et al. 1986). In the Sacramento River, 14 percent of the steelhead were returning to spawn a second time (Hallock 1989). Steelhead may migrate downstream to the ocean immediately after spawning or may spend several weeks holding in pools before outmigrating (Shapovalov and Taft 1954).

Egg Incubation, Alevin Development, and Fry Emergence. Eggs hatch after incubating 20 to 100 days, depending on water temperature (Shapovalov and Taft 1954, Barnhart 1991). Newly hatched steelhead alevins (yolk-sac larvae) remain in the gravel for an additional 14 to 35 days while being nourished by their yolk sacs (Barnhart 1991). Upon emergence, fry inhale air at the stream surface to fill their air bladders, absorb the remains of their yolks, and start to feed actively, often in schools (Barnhart 1991, NMFS 1996b). Survival from egg to emergent fry is typically less than 50 percent (Meehan and Bjornn 1991) but may be quite variable, depending upon local conditions.

Juvenile Freshwater Rearing. Juvenile steelhead (parr) rear in freshwater before outmigrating to the ocean as smolts. The time that parr spend in freshwater appears to be related to growth rate, with larger, faster-growing members of a cohort smolting earlier (Peven, Whitney, and Williams 1994). Steelhead in warmer areas, where feeding and growth are possible throughout the winter, may require a shorter period in freshwater before they smolt, while steelhead in colder, more northern, and inland streams may require 3 or 4 years before smolting (Roelofs 1985).

Juveniles typically remain in their natal streams for at least one summer, dispersing from fry schools to establish feeding territories (Barnhart 1991). Peak feeding and freshwater growth rates occur in late spring and early summer. Juveniles either overwinter in their natal streams, if adequate cover exists, or disperse to other streams as presmolts to seek more suitable winter habitat (Bjornn 1971, Dambacher 1991). When stream temperatures fall below about 44.6 degrees Fahrenheit (°F) in the late fall to early winter, steelhead enter a period of winter inactivity spent hiding in the substrate or closely associated with instream cover, during which time growth ceases (Everest and Chapman 1972). Juveniles’ winter hiding behavior reduces their metabolism and food requirements and reduces their exposure to predation and high flows (Bustard and Narver 1975), but substantial mortality still appears to occur in winter.

Smolt Outmigration and Estuarine Rearing. Steelhead migrate downstream to the ocean as smolts, typically at a length of 5.85 to 7.80 inches (Meehan and Bjornn 1991). A length of 5.46 inches is typically cited as the minimum size for smolting (Wagner, Wallace, and Campbell 1963; Peven, Whitney, and Williams 1994). Emigration appears to be more closely associated with size than age; 6 to 8 inches is the most common size of downstream migrants. Downstream migration in unregulated streams has been correlated with spring freshets (Reynolds et al. 1993). However, evidence suggests that photoperiod is the most important environmental variable that stimulates the physiological transformation from parr to smolt (Wagner 1974). During smoltification, the spots and parr marks characteristic of juvenile coloration are replaced by a silver and blue-green iridescent body color (Barnhart 1991) and physiological transformations occur that allow steelhead to survive in salt water.

Less is known about the use of estuaries by steelhead than about use by other anadromous salmonid species; however, available data show that in many systems, steelhead use estuaries as rearing habitat (NMFS 2008). Estuarine rearing may be more important to steelhead populations in the southern half of the species’ range because of greater variability in ocean conditions and the paucity of high-quality near-shore habitats in this portion of their range (Bond 2006, NMFS 1996a). Estuaries may also be more important to populations that spawn in smaller coastal tributaries because of the more limited availability of rearing habitat in the headwaters of smaller stream systems (McEwan and Jackson 1996).

Most marine mortality of steelhead occurs soon after they enter the ocean; predation is believed to be the primary cause of this mortality (Pearcy 1992, cited in McEwan and Jackson 1996). Predation mortality and fish size are likely to be inversely related (Pearcy 1992, cited in McEwan and Jackson 1996); therefore, the growth that takes place in estuaries may be very important for increasing the odds of marine survival (Shapovalov and Taft 1954, McEwan and Jackson 1996, NMFS 1996a, Bond 2006).

Steelhead have variable life histories. They may migrate downstream to estuaries as age 0+ juveniles or may rear in streams for up to 4 years before outmigrating to the estuary and ocean (Shapovalov and Taft 1954). Juvenile steelhead may rear in the estuary for 1 to 6 months before entering the ocean (Barnhart 1991). Several studies have shown that estuaries provide valuable rearing habitat to juvenile and yearling steelhead, and are not merely a corridor for smolts migrating to the ocean (Bond 2006, McEwan and Jackson 1996).

Ocean Phase. Most steelhead spend 1 to 3 years in the ocean, and smaller smolts tend to remain in salt water longer than larger smolts (Chapman 1958, Behnke 1992). Larger smolts have been found to experience higher ocean survival rates (Ward and Slaney 1988). Steelhead grow more rapidly in the ocean than in freshwater rearing habitats (Shapovalov and Taft 1954, Barnhart 1991). Unlike other salmonids, steelhead do not appear to form schools in the ocean. Steelhead in the southern part of the species' range appear to migrate close to the continental shelf, and more northern populations may migrate throughout the northern Pacific Ocean (Barnhart 1991).

Factors Affecting Central Valley Steelhead DPS

Environmental factors most likely to affect the abundance and distribution of the Central Valley steelhead DPS are discussed below.

Habitat Loss. The primary factor affecting Central Valley steelhead is the loss of access to suitable habitat. Major dams have blocked access to most steelhead habitat in Central Valley rivers and streams. Passable dams can contribute to migration delays. Hallock (1989) estimated that passage problems at RBDD alone had reduced annual adult steelhead runs in the upper Sacramento River system by approximately 6,000 fish. Subsequent recorded declines in steelhead counts at RBDD may indicate continuing adult migration problems at RBDD.

Flow. Reservoir operations and diversions have altered the natural flow regime of Central Valley streams by changing the frequency, magnitude, and timing of flows. These changes may affect all steelhead life stages. Inadequate instream flows caused by water diversions reduces available habitat and may lead to high water temperatures. Rapid flow fluctuations caused by water conveyance needs and flood control operations may strand redds and young fish.

For steelhead spawning to be successful, flows must provide appropriate water depths and velocities over suitable spawning gravels. Pool tails and riffles riffles with well-oxygenated gravels are often selected for redds (Shapovalov and Taft 1954). Flow also influences water temperature, which is a critical habitat factor for egg incubation (see below).

Suitable flows are necessary year round for juvenile rearing. After they emerge from spawning gravels in spring or early summer, steelhead fry move to shallow-water, low-velocity habitats such as stream margins and low-gradient riffles, and forage in open areas that lack instream cover (Hartman 1965, Everest et al. 1986, Fontaine 1988). As the fry grow, they increasingly use areas with cover and show a preference for flows with higher velocities. Older juvenile steelhead occupy a wide range of hydraulic conditions. A high flow level increases the habitat area available to juvenile steelhead because they commonly use submerged terrestrial vegetation on the channel edge and the floodplain. Greater flow increases average depth, which improves protection from avian and terrestrial predators (Everest and Chapman 1972). In broad low-gradient rivers, changes in flow levels can greatly increase or decrease the lateral area available to juvenile steelhead, particularly in riffles and shallow glides.

Production of fall-run Chinook salmon in the Merced, Tuolumne, and Stanislaus rivers has been shown to be limited by habitat conditions for rearing juveniles and outmigrating smolts (SJRRP 2007a). Similar studies have not been conducted for steelhead, but given that steelhead share many habitat requirements with fall-run Chinook salmon, the relationship is likely true for steelhead.

The stream reaches that are presently accessible to steelhead often lack the summer habitat conditions needed to sustain juvenile steelhead through their freshwater rearing period (NMFS 2008). These conditions can be exacerbated by reservoir operations and water diversions that reduce summer flows, and can be particularly severe in drought years.

Water Temperature. Water temperature is a primary limiting factor for natural steelhead production on many Central Valley streams (NMFS 2008). Although many dams provide downstream releases for fall Chinook salmon, most do not provide cool temperatures for steelhead during summer and fall, especially during critically dry periods (Moyle et al. 2008). Many dams are not able to provide cool water because they were not designed for deep-water reservoir releases or they lack adequate pool storage (McEwan 2001). Where releases of cold water occur throughout the summer, resident populations of trout often develop, supporting fisheries that may affect steelhead.

Spawning Gravels. Egg incubation success (egg hatching and fry emergence) is highly dependent on flow, water temperature, and levels of DO surrounding the developing embryos. Spawning gravels provide the conditions that promote reproductive success by steelhead. Barnhart (1986) reported gravels with high permeability and few fines (less than 5 percent sand and silt by weight) in highly productive steelhead spawning streams. Moyle (2002) reported that steelhead redds are constructed primarily in riffles that consist of coarse gravels. Most natural production of steelhead occurs in tributaries to the upper Sacramento River because spawning in the mainstem river is limited by the paucity of smaller gravel (Reynolds, Reavis, and Schuler 1990).

Dams have reduced or prevented the recruitment of spawning-size gravel to downstream riffles. Riffles downstream from dams are anticipated to continue to degrade as flood flows move gravel downstream without replenishment from upstream areas. Superimposition of redds may occur when spawning gravels are insufficient, leading to reduced spawning success.

Bank Modification and Loss of Riparian Habitat. Nearshore aquatic and riparian habitats have been degraded by the loss of riparian vegetation and streambank modification resulting from agricultural conversion, levee construction and maintenance, channelization, bank protection, and other land use activities in many Central Valley rivers. Such degradation has occurred along the middle and lower reaches of the Sacramento River and its major tributaries and the eastside tributaries of the San Joaquin River. Riparian vegetation along the Sacramento River is highly fragmented and constitutes less than 50 percent of its historical extent (California Resources Agency 1989). An inventory of river's-edge riparian habitat along the lower Sacramento River and Delta channels indicated a 22- to 26-percent reduction in such habitat since 1972, most of which was attributed to bank protection activities (California Resources Agency 1989). Riparian forest along the Tuolumne River is estimated to constitute less than 15 percent of its original extent (McBain and Trush 2000).

Dam construction, streambank modifications, removal of riparian vegetation, and other watershed activities have led to an overall decrease in the amount of IWM input into the riverine systems. IWM plays a variety of important ecological roles. The quality and quantity of fish habitat are directly enhanced by the presence of IWM, which provides overhead cover and additional instream structure (Lisle 1986, Everett and Ruiz 1993). Benefits of IWM in streams include the retention of organic debris, such as salmon carcasses (i.e., nutrient retention); the creation of cover between redds; and the creation of additional habitat for aquatic macroinvertebrates, a major component of fish diets. The abundance of salmonids is often positively associated with the abundance of IWM in a river (Bisson et al. 1987, Hartman and Brown 1987). In streams, IWM creates a diversity of hydraulic gradients that increases microhabitat complexity, especially beneficial for the early life stages of salmonid species.

Shaded riverine aquatic habitat, defined as the nearshore aquatic area at the interface between a river and adjacent woody riparian habitat, provides high-value feeding areas, escape cover, and reproductive cover for numerous fish species, including steelhead (USFWS 1992a). Riparian vegetation and other features of naturally eroding streambanks provide high-value rearing habitat for juvenile steelhead. Overhanging vegetation and banks moderate local water temperatures and provide shade, direct inputs of food (primarily terrestrial insects), and cover from predators.

Because of its unique biological attributes and its increasing scarcity throughout the Sacramento River system, shaded riverine aquatic cover has been designated a Resource Category 1, which is defined as "unique and irreplaceable on a national basis or in the ecoregion" (USFWS 1992a). A Category 1 designation requires project proponents, such as Reclamation, to actively seek impact avoidance and mitigation measures that result in no loss of existing habitat value.

Delta Exports and Entrainment. Water diversions reduce the survival levels of emigrating juvenile steelhead by causing direct losses at unscreened or inadequately screened diversions and indirect losses associated with reduced streamflows. Fish screening and salvage efforts at major agricultural diversions have met with variable levels of success, and many smaller unscreened or inadequately screened diversions continue to operate. Fish losses at diversions can result from physical injury, impingement, entrainment, or predation. Delayed passage, increased stress, and increased vulnerability to predation also contribute to mortality caused by diversions. Diversion impacts on anadromous fish depend on diversion timing and magnitude, river discharge, life stage, and other factors.

Diversions in the Delta entrain juvenile steelhead (Reclamation 2008). The CVP and SWP export facilities in the south Delta have fish screens used to salvage fish greater than a certain size (believed to be about 20 millimeters), but many of the salvaged fish are assumed not to survive their return to the Delta (Kimmerer 2004). Losses at the facilities have been shown to contribute to recent declines of steelhead (Reclamation 2008). Diversions reduce fitness not only by resulting in mortality from entrainment, but also by changing flow patterns that affect straying levels by upstream-migrating adults and outmigrating smolts.

Hatchery Operations. Four hatcheries in the Central Valley—Coleman National Fish Hatchery, Feather River Fish Hatchery, Nimbus Hatchery, and Mokelumne Hatchery—raise steelhead, producing an average of 1.5 million yearlings per year (McEwan 2001). Hatchery production can negatively affect fish populations by leading to a loss of genetic integrity primarily through hybridization, inbreeding, and random genetic change (drift). Hybridization presumably creates individuals that are less well-adapted to local conditions than either parent. Inbreeding results from the breeding of closely related individuals, and is likely to develop from hatchery production because eggs and milt are obtained from relatively few individuals. A small breeding population may also lead to genetic drift. Both inbreeding and genetic drift can lead to the production of individuals that are less well-adapted than naturally produced fish to the natural environment in which the species evolved.

The following are other potentially negative effects of producing hatchery fish:

- Displacement of wild steelhead juveniles through competition and predation.
- Competition of hatchery adults with wild adults for limited spawning habitat.
- Stimulation of sport and/or commercial harvest efforts, which could increase the harvest rate of naturally produced steelhead.
- An increase in the rate of disease among naturally produced fish.
- Negative social interaction between hatchery and wild steelhead.

These first two effects are well-documented for salmonids and may explain why only an estimated 10 to 30 percent of returning steelhead in the upper Sacramento River are of wild origin (Reynolds, Reavis, and Schuler 1990).

Altered Pathways for Adult and Juvenile Migration Through the Delta. Central Valley steelhead adults migrate upstream through the Delta primarily from November through January. Steelhead smolts emigrate through the Delta toward the ocean in spring, with migrations peaking during April and May. The Sacramento and San Joaquin rivers provide the most direct routes for adult migration through the Delta. When adult or juvenile steelhead stray from these channels, their migrations are delayed, and their exposure to stressful habitat conditions (e.g., warm water temperatures, predation, inadequate food resources) may increase.

Sacramento River water may be transported into the lower San Joaquin River via the Delta Cross Channel (DCC), Georgiana Slough, and Threemile Slough, and at the confluence of the Sacramento and San Joaquin rivers. The following factors affect the proportion of Sacramento River water drawn into the lower San Joaquin River:

- Diversions from and inflow to the Delta east of the Sacramento River.
- The position of the DCC gates.
- Tidal exchange patterns.
- Sacramento River discharge.

When the water mass in the lower San Joaquin River in the Delta consists primarily of Sacramento River water, adult steelhead that would spawn in the Sacramento River may be attracted to the south Delta, and migration may be delayed or blocked until the adults find their way back to the Sacramento River (Hallock et al. 1970).

Sacramento River juvenile steelhead enter the Delta via the Sacramento River during migration to the ocean. As stated above, the most direct route through the Delta is the Sacramento River channel. However, some steelhead juveniles may be drawn along an alternate route through the DCC and Georgiana Slough, resulting in delayed migration and an increase in losses caused by diversions and predation. Studies have demonstrated that survival levels of hatchery-reared fall-run Chinook salmon smolts that migrate directly down the Sacramento River are higher than those of smolts that migrate via the channels that connect to the San Joaquin River (Brandes and McLain 2001). Migration of Chinook salmon juveniles through the DCC and Georgiana Slough exposes them to increased predation, higher temperatures, additional agricultural diversions, and complex channel configurations (potentially delaying or preventing seaward migration). Juvenile steelhead may be similarly affected.

When San Joaquin River inflow to the Delta is less than export levels at the CVP and SWP pumps in the south Delta, or when Old River near Mossdale is closed with a barrier, flows in Old and Middle rivers north of the facilities are reversed (i.e., flow toward the south). Reverse flows in Old and Middle rivers may adversely affect juvenile steelhead migrating through the Delta because they may stray from the Sacramento River to the San Joaquin River (Brandes and McLain 2001).

Migration pathways through the Delta for San Joaquin River steelhead are more directly affected by altered flow patterns. Reverse flows in Old and Middle rivers are believed to affect steelhead from the San Joaquin River by altering the environmental cues used by the migrating fish (Mesick 2001). As a result, the juveniles are more vulnerable to being entrained by the pumps, and migrations of both adults and juveniles are delayed. Reverse flows are likely to cause increased straying of migrating adults into the south Delta, where their progress may be impeded by barriers and irregular flow patterns (Mesick 2001).

Inflow from the San Joaquin River affects steelhead movement through the south Delta, which is generally considered to have relatively poor rearing habitat conditions (Nobriga et al. 2008; Monsen, Cloem, and Burau 2007; Feyrer 2004). High inflows likely reduce straying of all life stages from the San Joaquin River channel into channels that lead toward the south Delta pumps. Higher inflows likely reduce the transit time of smolts through the Delta, thus reducing their time of exposure to predators, poor water quality, low food supply, and other mortality factors. Higher inflows may also provide stronger environmental cues for adult fish migrating upstream and smolts and other juveniles migrating downstream (Mesick 2001).

Inflow also affects water quality conditions in the south Delta. DO levels at the Stockton Deep Water Ship Channel (DWSC) are often low during late summer and early fall because of high water temperatures, algal biomass, and low river flow (Giovannini 2005, Lee and Jones-Lee 2003). Migrations of adult San Joaquin River salmon are often delayed by low DO levels near the Stockton DWSC (Giovannini 2005). Migrations of adult steelhead may also be affected, although steelhead adults migrate later in the year than fall-run Chinook salmon, when water temperature and DO conditions at the Stockton DWSC are generally much improved.

Sportfishing. Harvest of naturally spawned steelhead is prohibited within the Central Valley. Take is limited to one hatchery fish per day, and every hatchery fish is marked. Because hatchery fish are raised for harvest and are not particularly suitable to augmentation of wild stocks, their catch is not a detriment to the steelhead population as a whole. It is not clear what effect the incidental catch and release of wild steelhead has on the Central Valley steelhead population as a whole; however, some mortality likely occurs, which could be deleterious as wild fish numbers continue to decline and a greater percentage of the fish are caught and released.

Ocean Phase. Little is known about the use of ocean habitat by steelhead, although changes in ocean conditions are important for explaining trends among populations of steelhead along the Oregon coast (Kostow 1995). Evidence suggests that increased ocean temperatures associated with El Niño events may increase ocean survival as much as twofold (Ward and Slaney 1988). The magnitude of upwelling, which determines the amount of nutrients brought to the ocean surface and which is related to wind patterns, influences ocean productivity, with substantial effects on steelhead growth and survival (Barnhart 1991). Steelhead appear to prefer ocean temperatures of 48 to 53ºF and typically swim in the upper 30 to 40 feet of the ocean's surface (Barnhart 1991).

5.1.2 Delta Smelt

Delta smelt are endemic to the Delta (Moyle 2002). USFWS listed delta smelt as threatened (58 FR 12854–12864, March 5, 1993). In response to a petition received on March 9, 2006, from the Center for Biological Diversity, the Bay Institute, and the Natural Resources Defense Council, USFWS is currently considering information to determine whether the listing status should be upgraded from threatened to endangered (73 FR 74674–74675, December 9, 2008).

Critical habitat for delta smelt includes all of Suisun Bay, including the contiguous Grizzly and Honker bays; Goodyear, Suisun, Cutoff, First Mallard (Spring Branch), and Montezuma sloughs; and the Delta (59 FR 65256–65279, December 19, 1994).

USFWS issued the *Recovery Plan for the Sacramento–San Joaquin Delta Native Fishes* (USFWS 1996d). The recovery plan calls for the Delta to be managed to improve habitat for native fishes in general, with an emphasis on delta smelt. Recovery of delta smelt consists of population and habitat restoration, leading to delisting of the species. Delta smelt will be considered restored when the population abundance and distribution of the species return to levels that existed during the 1967 to 1981 period, as determined by criteria related to DFG’s fall midwater trawl surveys. Determination of the species’ recovery status includes a 5-year evaluation period that includes very high and low Delta outflow conditions, comparable to those that preceded their listing. Delta smelt will be considered for delisting when the species meets designated recovery criteria under the 5-year evaluation conditions, and when measures are in place to ensure their continued existence.

In 2004, USFWS completed the 5-year status review for delta smelt and concluded that the threats described in the original listing remained: destruction and modification of habitat resulting from extreme outflow conditions, operations of the CVP and SWP projects, and other water diversions. The review concluded that numbers of delta smelt risk falling below the effective population size and that, therefore, the Federal listing of delta smelt as a threatened species continued to be warranted (USFWS 2004).

Historic and Current Distribution

Delta smelt spend their entire lives in the Delta, Suisun Bay, and when Delta outflow is high, the eastern portion of San Pablo Bay. Their abundance has declined greatly in recent years, but their overall distribution is essentially unchanged (USFWS 2008). Under normal outflow conditions, delta smelt aggregate most of the year in the western Delta and eastern Suisun Bay to forage, and adults migrate upstream in winter to spawn in freshwater of the upper Delta. During periods of high Delta outflow, they also spawn in Suisun Marsh channels and the Napa River (Bennett 2005). Spawning adults and larvae have been found throughout the Delta, but they are typically most abundant in the northern, western, and central Delta (Bennett 2005).

Abundance Trends

Delta smelt have always varied in abundance from year to year, but they were once one of the most common fish species in the Delta (USFWS 2008). Numerous factors have likely contributed to a decline in the abundance and range of delta smelt:

- Hydraulic mining in the upper watershed of several of the tributaries of the Sacramento and San Joaquin rivers, which altered sediment and flow patterns in the Delta.

- Construction of levees in the Delta, which resulted in a loss of seasonally flooded habitats and further changed flow patterns.

- Introduction of exotic fish and invertebrate species, which compete with delta smelt for zooplankton, compete with the preferred prey of delta smelt for algae, or prey on the smelt.

- Reduced water quality, which affects both delta smelt and its prey.

- Water exports, which entrain smelt, radically change natural flow patterns in the Delta, and adversely affect the location of the low-salinity zone (LSZ).

The LSZ is a shifting area of low salinity, and is a habitat for a suite of specialized organisms that survive in its unique confluence of freshwater and marine influences (Kimmerer 2004). The LSZ centers around 2 practical salinity units and ranges from about 6 practical salinity units down to 0.5 practical salinity unit. According to seven abundance indices designed by the Interagency Ecological Program for the San Francisco estuary to record trends in abundance, the population of delta smelt has been consistently low relative to historical levels of abundance for several years (USFWS 2008). For example, the summer tow-net survey has recorded relatively low levels of abundance since 1983, with only a few exceptions. In addition, results from the fall midwater trawl surveys indicate that the abundance has declined irregularly over the past 20 years. In recent years, the abundance of delta smelt has declined even further, including record low delta smelt abundance indices since 2002. The recent decline has occurred despite relatively high Delta inflow conditions during several years. In addition to declines in delta smelt and other fish species, abundance trends for many zooplankton species that are important prey for numerous life stages of delta smelt have also declined.

Life History

As mentioned previously, delta smelt complete their life cycle entirely within the Delta and the seaward estuary. Occasionally, delta smelt are found in the Sacramento and San Joaquin rivers upstream from the Delta. Most delta smelt live for only a year, but a small proportion of adults survive to spawn in a second year (Moyle 2002). They are pelagic, inhabiting open water away from the shoreline and bottom. Delta smelt tolerate a relatively broad range of salinities, aggregating in brackish water (the LSZ) during most of the year, and migrating into freshwater to spawn.

Adult delta smelt begin their spawning migrations, which may last for several months, during December or January. Spawning location varies from year to year, depending in part on Delta inflows (Bennett 2005). In recent years, concentrations of larvae have been found in Cache Slough and the Sacramento DWSC in the north Delta, although spawning also occurs in the lower Sacramento and San Joaquin rivers (USFWS 2008). In years of high Delta outflow, delta smelt may spawn in Suisun Marsh or the Napa River, a tributary of San Pablo Bay. The upstream migration seems to be triggered or cued by abrupt changes in flow and turbidity associated with the first flush of winter rain, but can also occur after very high flood flows have receded (USFWS 2008). Spawning occurs from February through June, with peak spawning in April and May (Bennett 2005).

Spawning generally begins when water temperatures approach 54ºF and ceases when they are around 64ºF (USFWS 2008). Spawning has never been observed in the wild, but sand and gravel are believed to be preferred spawning substrates (Bennett 2005). Eggs sink to the bottom and attach to the substrate.

Egg incubation takes 7 to 18 days, depending on water temperature, and larvae begin feeding 4 to 6 days later (Bennett 2005). Larval smelt feed on small zooplankton. Larvae and juveniles gradually move downstream toward rearing habitat in the LSZ (indexed as X2, which is defined as the distance from the Golden Gate Bridge where water salinity is 2 parts per thousand (ppt)), where they reside until the following winter (Moyle 2002). The juveniles typically begin to appear in the population in May, and may remain in upstream portions of the Delta for about a month, particularly during years with low Delta inflow. The location of the delta smelt population follows changes in the location of the LSZ, which depends primarily on Delta outflow.

Factors Affecting Delta Smelt

Flow. Delta flows have major effects on delta smelt. Except under flood flow conditions, the largest flows in the Delta are tidal flows, which far exceed other flows in most Delta channels, but the nontidal flows determine the net direction of water movement and therefore strongly affect the distribution of delta smelt.

Spring storage of runoff in upstream reservoirs, summer reservoir releases for agriculture, and large-volume exports from the CVP and SWP facilities in the south Delta have been especially instrumental in altering the natural spatial and temporal flow patterns of the Delta. The CVP and SWP pumps have a strong effect on distributions of delta smelt in the south Delta because the exports often cause water to flow upstream (i.e., reverse flow). Reverse flows in the south Delta make delta smelt more vulnerable to entrainment at the pumps and create conditions that delay migrations. Reverse flows are believed to affect fish movements by direct transport of weak swimmers such as larval fish (Monson et al. 2007, Kimmerer 2004), and by inappropriate environmental cues for migrating adult fish.

Elevated Delta inflows counteract the negative effects of the export pumps on flow patterns, providing appropriate environmental cues for upstream-migrating adults and successfully transporting newly hatched larvae to the LSZ. Extreme flood flows may be catastrophic, however, because delta smelt and their food resources can be flushed out of the ecosystem entirely.

Delta outflow largely determines the location of X2 and the LSZ, which is an area that historically had high prey densities and other favorable habitat conditions for rearing delta smelt (Kimmerer 2004). The LSZ is believed to provide the best combination of habitat conditions when X2 is located downstream from the confluence of the Sacramento and San Joaquin rivers. When Delta outflow is low, X2 is located in the relatively narrow channels of these rivers, whereas at higher outflows it moves downstream into more open waters (Kimmerer 2004).

Delta smelt may be vulnerable to reverse flows and entrainment in south Delta pumps at any time during their lives; however, they are especially vulnerable as mature adults during spawning migrations, especially in the central or south Delta, and as larvae before their downstream migration. However, in years of low Delta outflow, when the LSZ is located upstream from the confluence of the Sacramento and San Joaquin rivers, all life stages of delta smelt may be subject to the influence of reverse flow and movement into the south Delta.

Temperature. The south Delta often has poor water temperatures for delta smelt, especially during late summer and early fall (Nobriga et al. 2008, Feyrer 2004, Kimmerer 2004). Water temperature is high relative to other parts of the Delta, presumably because it receives inflow from the San Joaquin River directly, which is likely to be somewhat warmer than the Sacramento River, and because of a longer residence time for water in the south Delta.

Entrainment. The Jones and Banks export facilities are the largest diversions in the Delta, and entrain millions of fish each year, including adult, juvenile, and larval delta smelt (Reclamation 2008). The facilities have fish screens used to salvage fish greater than a certain size (believed to be about 20 millimeters), but many of the salvaged fish are assumed not to survive the return to the Delta (Kimmerer 2004) because they are delicate. Losses at the export facilities have been shown to contribute to recent declines of delta smelt (Kimmerer 2008). Diversions reduce fitness not only by resulting in mortality from entrainment, but also by changing flow patterns that determine how delta smelt and important habitat variables are distributed in the Delta. Power plants, municipal diversions, and hundreds of agricultural diversions in the Delta are also responsible for entraining delta smelt.

Contaminants. Toxic chemicals such as mercury, selenium, and pesticides are a concern for Delta fishes, although their effect on delta smelt is uncertain (Bennett 2005). Recently, high levels of ammonium from the Sacramento Regional Wastewater Treatment Plant discharge have been suggested as a possible cause of reduced productivity of the food web supporting delta smelt (Dugdale 2008).

Predation. Delta smelt are vulnerable to predation by striped bass, largemouth bass, and other piscivorous fish species. The larvae are vulnerable to predation by many other fishes, including inland silversides and juvenile Chinook salmon and steelhead (Bennett 2005). Predation rates for delta smelt are likely higher in the south Delta than in other parts of the Delta for several reasons:

- Turbidity is generally lower in the south Delta, and therefore fish are more visible to their predators (Nobriga et al. 2008; Feyrer, Nobriga, and Sommer 2007).

- Many of the structures and facilities in the south Delta, particularly Clifton Court Forebay and the fish louver screens at the Jones and Banks facilities, concentrate or disorient prey fish and provide ambush sites for predacious fish (Reclamation 2008).

- Recent invasions by the submerged plant Brazilian waterweed (*Egeria densa*) provide favorable habitat conditions for black bass species, which prey heavily on young fish life stages (Nobriga and Feyrer 2007, Nobriga et al. 2005).

Food Resources. Juvenile and adult smelt eat primarily copepods, but they also prey on cladocerans, mysids, amphipods, and larval fish (Bennett 2005). During the 1970s and 1980s, delta smelt diets were dominated by zooplankton (*Eurytemora affinis*, *Neomysis mercedis*, and *Bosmina longirostus*), but none of these are currently important prey (USFWS 2008). When delta smelt diets were examined again between 1988 and 1996, they were consistently dominated by the copepod *Pseudodiaptomus forbesi*, which was introduced and became abundant after the invasion of Suisun Marsh by the overbite clam. More recent introductions of copepod species have adversely affected delta smelt feeding (USFWS 2008).

Introduction of the overbite clam to the Delta in 1986 was followed by a dramatic decline in algae production. The clam does not encroach into freshwater, but its grazing effect does, presumably because of the tides. The clam has reduced the standing crop of algae to fractions of historic levels, which has contributed to declines in the abundances of many zooplankton and fish species, but the contribution to delta smelt's decline is uncertain (Kimmerer 2002, Bennett 2005).

Pseudodiaptomus was historically most abundant in the LSZ, but abundances of *Pseudodiaptomus* and other important prey species of delta smelt in the LSZ have declined in recent years, presumably because the overbite clam is now abundant in Suisun Bay and the lower Delta. As previously indicated, the LSZ is typically located near the juncture of the Delta and Suisun Bay. During this period, *Pseudodiaptomus* has increased in the south Delta, where it is now more abundant than in the LSZ. Because of the elevated risks of entrainment and predation, the south Delta is not good foraging habitat for delta smelt. However, *Pseudodiaptomus* produced in the south Delta may be transported to other areas where it would be a potentially important food resource for delta smelt.

5.1.3 Sacramento River Winter-Run Chinook Salmon

The Sacramento River winter-run Chinook salmon is designated as an endangered species under the Federal ESA (59 FR 440, January 4, 1994). In 2004, NMFS evaluated whether Sacramento River winter-run Chinook salmon were still in danger of extinction and proposed downgrading the species' status to threatened; however, after review, NMFS determined that protective measures in place were not enough to alter the level of extinction risk and determined that the status should remain endangered (70 FR 170, September 2, 2005). Designated critical habitat for the Sacramento River winter-run Chinook salmon does not overlap the Action Area, but winter-run salmon are known to stray into the Action Area from the Delta portion of the Sacramento River.

NMFS is preparing a recovery plan for all listed Chinook salmon in the Central Valley. NMFS issued a recovery outline in 2007, which serves as interim guidance until the full recovery plan is released. The outline identifies the factors that led to the decline of the evolutionarily significant units (ESU) and DPSs, describes past conservation efforts, and provides a preliminary list of recommended recovery measures. Some of the measures listed are provided in the species account for Sacramento River winter-run Chinook salmon.

Historic and Current Distribution

Sacramento River winter-run Chinook salmon historically migrated all the way to the upper reaches of the Sacramento River and its tributaries, but barriers now restrict winter-run Chinook salmon to the river below Keswick Dam. Spawning occurs primarily in the Sacramento River upstream from RBDD. Adult and juvenile winter-run Chinook salmon migrate through the Delta and Suisun, San Pablo, and San Francisco bays.

Abundance Trends

Historical winter-run populations of Sacramento River winter-run Chinook salmon approached an estimated 100,000 fish in the 1960s, but declined to fewer than 200 fish in the 1990s (NMFS 2008). In recent years, population estimates of winter-run from carcass surveys included a high of 17,334 in 2006, followed by a precipitous decline in 2007 to 2,488 and a preliminary estimate of 2,850 in 2008 (NMFS 2008).

Life History

Sacramento River winter-run Chinook salmon have life history traits similar to steelhead. Because only adults and juveniles occur in the Action Area, only these two life stages are discussed below.

Upstream Migration. Adult winter-run Chinook salmon leave the ocean and migrate through the Delta into the Sacramento River from November through July. They migrate upstream past RBDD on the Sacramento River from mid-December through July, with most of the spawning population having passed RBDD by late June (69 FR 237, December 10, 2004).

Juvenile and Smolt Emigration. Juvenile winter-run Chinook salmon rear in and emigrate through the Sacramento River and its tributaries from July through March (Hallock and Fisher 1985). Juveniles descending the Sacramento River above RBDD, from August through October and possibly November, are mostly presmolts. Juveniles have been observed in the Delta from October through December, especially when Sacramento River discharge is high because of fall and early-winter storms. Juvenile Chinook salmon move into downstream habitats in response to many factors, such as inherent behavior, habitat availability, flow, competition for space and food, and water temperature. The number of juveniles and the timing of their movement are highly variable. Storm events and the resulting high flows appear to trigger movement by substantial numbers of juveniles to downstream habitats. In general, the abundance of juvenile Chinook salmon in the Delta increases as flows increase (USFWS 1996).

Factors Affecting Sacramento River Winter-Run Chinook Salmon

Environmental factors most likely to affect the abundance and distribution of the Sacramento River winter-run Chinook salmon ESU are discussed below.

Flow. Reservoir operations have altered the natural flow regime of Central Valley streams by changing the frequency, magnitude, and timing of flows. These changes may affect all winter-run Chinook salmon life stages. Changes in the magnitude and timing of reservoir releases can influence the timing of migration by winter-run Chinook salmon.

Suitable flows are necessary for juvenile rearing. A high flow increases the rearing area available to juvenile Chinook salmon because they commonly use submerged terrestrial vegetation on the channel edge and the floodplain. Deeper inundation provides more overhead cover and protection from avian and terrestrial predators than shallow water (Everest and Chapman 1972). In broad low-gradient rivers, changes in flows can greatly increase or decrease the lateral area available to juvenile Chinook salmon, particularly in riffles and shallow glides.

Temperature. Deleterious water temperatures during spawning, incubation, and early rearing periods restrict the winter-run salmon to the Sacramento River primarily upstream from RBDD. Survival of juveniles begins to decline substantially at temperatures above 65°F. During the period when juvenile winter-run Chinook salmon migrate through the Delta, water temperature is generally below 60°F. Therefore, winter-run salmon juveniles likely do not experience a high magnitude of loss as a result of Delta water temperatures (USFWS 1996).

Barriers to Fish Passage. Sacramento River winter-run Chinook salmon historically spawned in the upper Sacramento River and its major tributaries, the McCloud and Pit rivers. The construction of Shasta Dam blocked access to historical habitat and restricted spawning to the mainstem Sacramento River immediately downstream.

Operation of RBDD is considered one of the primary causes of the reduction in abundance of winter-run Chinook salmon. RBDD is a barrier to upstream-migrating adults, preventing up to 40 percent of the winter-run Chinook salmon from passage upstream and delaying the remaining fish for several days (USFWS 1988, Hallock 1983). Salmon that are delayed may suffer reduced fecundity. Winter-run that do not migrate upstream past RBDD do not spawn successfully during most years because of elevated water temperatures (Hallock 1983).

Since 1986, the RBDD gates have been raised during winter and early spring as part of a protection program for winter-run Chinook salmon, thereby reducing delays and blockage of adults. Improved passage through RBDD after 1986 has not reversed the decline in abundance, however. Abundance increased in 2005 and 2006, but this increase may have been the result of ocean conditions or other factors.

Altered Pathways for Adult and Juvenile Migration Through the Delta. The most direct route through the Delta for migrating adult winter-run Chinook salmon is the Sacramento River channel. Sacramento River water may be transported into the lower San Joaquin River via the DCC, Georgiana Slough, and Threemile Slough, and at the confluence of the Sacramento and San Joaquin rivers. The following factors affect the proportion of Sacramento River water drawn into the lower San Joaquin River:

- Diversions from and inflow to the Delta east of the Sacramento River.
- The position of the DCC gates.
- Tidal exchange patterns.
- Sacramento River discharge.

When most of the water mass in the lower San Joaquin River originates from the Sacramento River, adult winter-run Chinook salmon may be attracted to the south Delta, delaying their migration (Hallocket al. 1970).

The effect of delay on spawning conditions depends on the duration of delay and the condition of females during the spawning migration. Winter-run Chinook salmon females usually pass through the Delta in green condition (i.e., before eggs mature) and the eggs ripen months after the salmon arrive in their natal spawning area.

Juvenile winter-run Chinook salmon enter the Delta via the Sacramento River during migration to the ocean. As stated above, the most direct route through the Delta is the Sacramento River channel. However, some winter-run Chinook salmon juveniles are drawn along an alternate route through the DCC and Georgiana Slough, resulting in delayed migration and an increase in losses caused by diversions and predation. Studies have demonstrated that survival of hatchery-reared fall-run Chinook salmon smolts that migrate directly down the Sacramento River is higher than that of smolts that migrate via the channels connecting to the San Joaquin River (Brandes and McLain 2001). Migration of Chinook salmon juveniles through the DCC and Georgiana Slough exposes them to increased predation, higher temperatures, additional agricultural diversions, and complex channel configurations that may delay or prevent seaward migration. Juvenile winter-run Chinook salmon may be similarly affected.

When San Joaquin River inflow to the Delta is less than export levels at the CVP and SWP export facilities in the south Delta, or when Old River near Mossdale is closed with a barrier, flows in Old and Middle rivers north of the facilities are reversed. Reverse flows in Old and Middle rivers may adversely affect juvenile Chinook salmon migrating through the Delta, including Sacramento River winter-run Chinook salmon that have entered the central Delta (USFWS 1992b, 1995).

In December 1999, under low-flow conditions and high export pumping rates, Delta salinity increased when the DCC gates were closed to protect emigrating juvenile Sacramento River winter-run Chinook salmon. This experience and other, similar experiences in recent years have indicated the need for tools to facilitate operating the DCC gates to better balance fisheries, water quality, and water supply objectives. This understanding led CALFED to consider how to preserve both the benefits to fish of closing the DCC gates and the benefits to water quality of diverting Sacramento River water into the interior Delta, particularly during low-flow periods. As a result, proposals are being considered to screen the DCC gates to divert a smaller amount of water than the present capacity of the gates. The understanding also led to provisions in the 1995 water quality control plan and recent BOs for listed Chinook salmon that require closure of the DCC during extended periods of time. Closures were designed to reduce the fraction of salmon diverted to the interior Delta, thus improving overall salmon survival (69 FR 237, December 10, 2004).

The CVP and SWP export facilities in the south Delta adversely affect survival of anadromous fish in the Delta by resulting in direct losses caused by entrainment and in indirect effects related to changes in the magnitude and direction of flow in Delta channels. Increases in upstream storage and diversions over the last 20 years have significantly reduced inflow to the Delta. Reduced inflow, in combination with increased exports from the Delta, has caused an increase in adverse impacts on anadromous and resident species by reducing net flow through the Delta and Delta outflow.

Diversions. Water diversions reduce the survival levels of emigrating juvenile salmonids by causing direct losses at unscreened or inadequately screened diversions and indirect losses associated with reduced streamflows. Fish screening and salvage efforts at major agricultural diversions have met with variable levels of success, and many smaller unscreened or inadequately screened diversions continue to operate. Fish losses at diversions can result from physical injury, impingement, entrainment, or predation. Delayed passage, increased stress, and increased vulnerability to predation also contribute to mortality caused by diversions. Diversion impacts on anadromous fish depend on diversion timing and magnitude, river discharge, life stage, and other factors.

Juvenile winter-run Chinook salmon migrate through the Delta from January through April. Agricultural diversion levels are low during most of this period, and are highest during late spring and summer (DWR 1990). Diversion levels at the CVP and SWP pumps are high during March and April, however, and entrainment losses of winter-run Chinook salmon juveniles may be substantial (DWR 1990). Storm events and increased Sacramento River discharge may move many winter-run juveniles to the Delta between October and January. Increased Delta exports during such times likely increase direct and indirect entrainment losses.

Harvest. Although ocean harvest of Sacramento River winter-run Chinook salmon is not considered a key factor leading to the decline of the population, NMFS does consider ocean harvest to be a significant source of mortality to the population (69 FR 237, December 10, 2004). The harvest rate of winter-run Chinook salmon is lower than the harvest rate calculated for other runs, primarily because winter-run adults migrate from the ocean from December through May, before the main fishing season opens (NMFS 1996). Sacramento River winter-run Chinook salmon adults migrate when they are 2 to 3 years old. Fish that are 2 years old do not reach legal commercial size in the ocean, and most 3-year-old fish reach legal size late in the commercial season. Legal size limits for sportfishing allow the take of 2-year-old fish, and about 70 percent of the ocean catch of Sacramento River winter-run Chinook salmon may be attributable to sportfishing (NMFS 1996).

Ocean-fishing regulations have been implemented that further restrict the sport season and close some areas to fishing, but the effects of these changes on catch of Sacramento River winter-run Chinook salmon are uncertain. DFG and NMFS do not consider fishing mortality a major factor in the decline of the winter-run Chinook salmon population

(DFG 1989). Fishing mortality, however, could delay recovery of the run if other limiting factors were ameliorated.

5.1.4 Central Valley Spring-Run Chinook Salmon

On September 16, 1999, the Central Valley spring-run Chinook salmon ESU was listed as threatened under the Federal ESA by NMFS. This ESU includes all naturally spawned populations of spring-run Chinook salmon in the Sacramento River and its tributaries (NMFS 1999). Critical habitat for this species was designated on February 16, 2000 (65 FR 7764). However, on April 30, 2002, a U.S. district court approved a NMFS consent decree withdrawing the critical habitat designation for this and 18 other ESUs of salmon and steelhead. On December 10, 2004, NMFS published a new proposal to designate critical habitat for 7 ESUs of Chinook salmon and steelhead in California, including the Central Valley spring-run Chinook salmon (69 FR 237). The final designation for critical habitat was published on September 2, 2005, and became effective on January 2, 2006. The critical habitat includes roughly 1,272 miles of occupied stream habitat and 427 square miles of estuarine habitat, including the north Delta (the central and south Delta were excluded) and Suisun, San Pablo, and north San Francisco bays (NMFS 2004; 70 FR 170, September 2, 2005). The only area of critical habitat within the Action Area consists of the northern portions of the DCC, Georgiana Slough, and Threemile Slough, which connect the Sacramento and San Joaquin rivers.

NMFS is in the process of preparing a recovery plan for all listed Central Valley salmon, including Central Valley spring-run Chinook salmon. NMFS issued a recovery outline in 2007, which serves as interim guidance until the full recovery plan is released. The outline identifies the factors that have led to the decline of the ESUs and DPSs, describes past conservation efforts, and provides a preliminary list of recommended recovery measures. Some of the measures listed are provided in the species account for Central Valley spring-run Chinook salmon.

Historic and Current Distribution

In the Central Valley, spring-run Chinook salmon historically migrated upstream to the headwaters of the larger tributaries to the Sacramento and San Joaquin rivers, where they held for several months in deep cold pools (Moyle 2002). Historic runs were reported in the McCloud, Pit, Little Sacramento, Feather, Yuba, and American rivers, and in the San Joaquin, Stanislaus, Tuolumne, and Merced rivers (Moyle 2002). Today, Central Valley spring-run Chinook salmon persist in only a few systems within the Sacramento River watershed.

Abundance Trends

Spring-run Chinook salmon in the Central Valley was once among the largest runs on the Pacific Coast (Yoshiyama, Fisher, and Moyle 1998). The Sacramento River drainage alone was estimated to support more than 100,000 spring-run Chinook salmon in many years between the late 1800s and 1940s (Moyle 2002). Before the construction of Friant Dam, nearly 50,000 adults were counted in the San Joaquin River alone (Fry 1961). Construction of other dams on the American, Mokelumne, Stanislaus, Tuolumne, and Merced rivers extirpated the spring-run from these watersheds. Dam construction and irrigation diversions, which eliminated access to upstream spawning and holding areas, extirpated the spring-run from the San Joaquin River Basin by the late 1940s (Skinner 1962) and greatly reduced spring-run numbers in the Sacramento River Basin. Because of extensive hatchery introductions, most spring-run Chinook currently in the Sacramento River mainstem have hybridized with fall-run fish and are heavily introgressed with fall-run Chinook characteristics, particularly with regard to run timing (Yoshiyama, Fisher, and Moyle 1998). Stocks in Deer, Mill, and Butte creeks appear to have minimal to no hatchery influence.

The abundance of adult Central Valley spring-run Chinook salmon ESU has broadly fluctuated, ranging from 1,403 in 1993 to 25,890 in 1982 (NMFS 2008). Sacramento River tributary populations in Mill, Deer, and Butte creeks are probably the best trend indicators for the spring-run ESU as a whole because these streams contain the primary independent populations within the ESU. Generally, these streams have shown a positive escapement trend since 1991. Escapement numbers are dominated by Butte Creek returns, which have averaged more than 7,000 fish since 1995. During this same period, adult returns have averaged 778 fish on Mill Creek and 1,463 fish on Deer Creek. Although recent trends are positive, annual abundance estimates display a high level of fluctuation, and the overall number of spring-run remains far below estimates of historic abundance.

Life History

Some spring-run Chinook salmon are thought to exhibit a classic "stream-type" life history pattern (Moyle 2002). Stream-type Chinook salmon spend 1 or more years in freshwater before migrating downstream toward the ocean. As a result, stream-type juveniles are more dependent on freshwater streams. Stream-type (yearling) smolts are much larger than their ocean-type (subyearling) counterparts when entering salt water; therefore, they are able to move offshore relatively quickly, making extensive offshore oceanic migrations. This life-history pattern can separate spring-run Chinook salmon from other salmon runs.

Spring-run Chinook salmon historically migrated farther upstream than other Chinook salmon runs, taking advantage of higher elevation habitats that were inaccessible during summer and fall months (as a result of high temperatures and low flows in lower reaches) (Moyle 2002). This geographic separation also helped preserve their genetic integrity (Moyle 2002).

Only the adults and juveniles of Central Valley spring-run Chinook salmon occur in the Action Area, so only these two life stages are discussed below.

Upstream Migration and Holding. Spring-run Chinook salmon begin their upstream migration in late January to early February (DFG 1998). They enter freshwater as sexually immature adult fish, and their holding period can last for several months before individuals are ready to spawn (Moyle 2002, DFG 1998). Spawning occurs during the fall. Like all other runs of Chinook salmon, adult spring-run Chinook salmon cease feeding after entering freshwater, so they need to conserve energy as they over-summer. Deep, cool, and oxygenated pools are important for salmon energy conservation (Berman and Quinn 1991, DWR and Reclamation 2000).

Juvenile and Smolt Emigration. Juvenile spring-run Chinook salmon may rear in streams for 1–15 months. Some authors (Yoshiyama, Fisher, and Moyle 1998; Moyle 2002) suggest that the spring-run may be rearing for a shorter period than in years past as a response to altered flow regimes (caused by dams and diversions) and their restriction to lower elevation sections of streams (again, because of dams). Rearing occurs in natal streams, the mainstem of the Sacramento River, nonnatal streams, and the Delta. Juveniles that remain in their natal streams to rear tend to emigrate as yearlings, and those that rear in nonnatal streams leave as young-of-the-year (YOY).

Outmigrants may spend some time in the Sacramento River or in the estuary and gain additional size before smolting and migrating out to sea. Juveniles that migrate as yearlings move downstream with the onset of the stormy season, beginning in October of the year after spawning and continuing through March (DFG 1998).

Factors Affecting Central Valley Spring-Run Chinook Salmon

The environmental factors most likely to affect the abundance and distribution of the Central Valley spring-run Chinook salmon ESU are discussed below.

Flow. Reservoir operations have altered the natural flow regime of Central Valley streams by changing the frequency, magnitude, and timing of flow. These changes may affect all spring-run Chinook salmon life stages. Changes in the magnitude and timing of reservoir releases can influence the timing of migration by spring-run Chinook salmon. Relatively early attraction of spring-run Chinook salmon into tributaries can be triggered by occasional releases of cold water from reservoirs or the occurrence of naturally high flows early in the fall. Conversely, low flows and higher water temperatures can inhibit or delay migration to spawning areas.

Suitable flows are necessary year round for juvenile rearing. As flow increases, the area preferred by juvenile Chinook salmon shifts from the center of the channel to submerged terrestrial vegetation on the channel edge and the floodplain. Deeper inundation provides more overhead cover and protection from avian and terrestrial predators than shallow water (Everest and Chapman 1972). In broad low-gradient rivers, changes in flows can greatly increase or decrease the lateral area available to juvenile Chinook salmon, particularly in riffles and shallow glides.

The stream reaches that are presently accessible to spring-run Chinook salmon often lack the summer habitat conditions needed to sustain juvenile spring-run through their freshwater rearing period (70 FR 170, September 2, 2005). These conditions can be exacerbated by reservoir operations and water diversions that reduce summer flows, and can be particularly severe in drought years.

Water Temperature. Water temperature is a primary limiting factor for natural production of spring-run Chinook salmon on Central Valley streams (NMFS 1999). Appropriate water temperature regimes below many dams cannot be maintained at levels comparable to what was achieved naturally in the upper watersheds that previously provided habitat.

Altered Pathways for Adult and Juvenile Migration Through the Delta. The most direct route through the Delta for migrating adult and juvenile spring-run Chinook salmon is the Sacramento River channel. Factors affecting straying of spring-run adults and juveniles in the Delta and potential consequences are the same as those described above for winter-run Chinook salmon.

Diversions. Water diversions reduce the survival levels of emigrating juvenile salmonids by causing direct losses at unscreened or inadequately screened diversions and indirect losses associated with reduced streamflows. Fish screening and salvage efforts at major agricultural diversions have met with variable levels of success, and many smaller unscreened or inadequately screened diversions continue to operate. Fish losses at diversions can result from physical injury, impingement, entrainment, or predation. Delayed passage, increased stress, and increased vulnerability to predation also contribute to mortality caused by diversions. Diversion impacts on anadromous fish depend on diversion timing and magnitude, river discharge, life stage, and other factors.

The CVP and SWP export facilities in the south Delta adversely affect survival of anadromous fish in the Delta by resulting in direct losses caused by entrainment and in indirect effects related to changes in the magnitude and direction of flow in Delta channels. Increases in upstream storage and diversions over the last 20 years have significantly reduced inflow to the Delta. Reduced inflow, in combination with increased exports from the Delta, has caused an increase in adverse impacts on anadromous and resident species by reducing net flow through the Delta and Delta outflow. Unscreened Delta diversions have contributed to fish losses.

A portion of the juvenile spring-run Chinook salmon migrating down the Sacramento River may be drawn toward the CVP and SWP pumps. Although both pumping plants have louver-type fish screens that may be 90 percent effective for downstream-migrating spring-run Chinook salmon, high prescreening losses attributed to predation also occur, particularly at the CVP and SWP pumping plants.

5.1.5 Southern Distinct Population Segment of North American Green Sturgeon

North American green sturgeon have been separated into two DPSs: the northern DPS (all populations north of and including the Eel River) and the southern DPS (coastal and Central Valley populations south of the Eel River). On April 15, 2004, NMFS announced that the listing status of the northern and southern DPSs of green sturgeon would change from a candidate species to a species of concern (69 FR 117, June 18, 2004). However, litigation challenged the determination by NMFS that green sturgeon did not warrant listing as an endangered or threatened species under the ESA. The legal challenge asserted that the agency was arbitrary and capricious in failing to examine whether habitat loss constituted a significant portion of the species' range (70 FR 65, April 6, 2005). The court partially agreed with the plaintiff's motion, and remanded the determination to NMFS for further analysis and decision on whether green sturgeon are endangered or threatened in a significant portion of their range. After the review, the southern DPS was listed as threatened under the Federal ESA (71 FR 67, April 7, 2006).

NMFS has not prepared a recovery plan for the southern DPS of North American green sturgeon. However, NMFS did prepare a status review update for green sturgeon that includes a discussion of factors responsible for the decline of green sturgeon and a description of restoration objectives and recovery criteria (http://www.nmfs.noaa.gov/pr/pdfs/statusreviews/greensturgeon_update.pdf).

Historic and Current Distribution

Green sturgeon are found in the lower reaches of large rivers from British Columbia south to the Sacramento River. The southernmost spawning population is in the Sacramento River. Spawning populations existed historically in the Eel and Klamath-Trinity River systems. The Klamath River still maintains a spawning population, but the Eel and Trinity rivers do not. In the Central Valley, spawning habitat may have extended to the Butte Creek watershed. Currently, spawning occurs in the mainstem Sacramento River and some spawning may occasionally take place in the Feather River (Beamesderfer and Webb 2002). Juvenile fish have been collected in the Sacramento River near Hamilton City, and in the Delta and San Francisco Bay. Adults and juveniles have been observed near RBDD in late winter and early spring. Individuals tagged by DFG in the Delta have been recaptured off Santa Cruz, California; in Winchester Bay on the southern Oregon coast; at the mouth of the Columbia River; and in Grays Harbor, Washington (Moyle 2002).

Abundance Trends

Limited information about population abundance for the southern DPS of North American green sturgeon comes from incidental captures by a DFG sturgeon tagging program to monitor white sturgeon (NMFS 2008). By comparing ratios of white-sturgeon to green-sturgeon captures, DFG provides estimates of adult and subadult green sturgeon abundance. Estimated abundance between 1954 and 2001 ranged from 175 fish to more than 8,000, with an average of 1,509 fish per year. However, because of biases and errors, DFG does not consider these estimates reliable.

The only existing information about changes in the abundance of the southern DPS of green sturgeon relates to changes in abundance in green sturgeon salvage at the south Delta export facilities between 1968 and 2006. Before 1986, the average number of southern DPS of green sturgeon salvaged per year at the two export facilities combined was 1,621; from 1986 on, the average per year was fewer than 100 (70 FR 17386–17401, April 5, 2005). In light of the increased exports, particularly during the previous 10 years, it is clear that the abundance of green sturgeon is declining. Recent spawning population estimates using sibling-based genetics indicate spawning populations of 32 spawners in 2002, 64 in 2003, 44 in 2004, 92 in 2005, and 124 in 2006 above RBDD (with an average of 71) (NMFS 2008).

Life History

Green sturgeon are anadromous, migrating from the ocean between March and July to spawn when temperatures in the rivers are between 45 and 57°F. Females produce 60,000–140,000 eggs that are broadcast in swift water and are then fertilized externally. Eggs hatch in about 8 days at 55°F. Juveniles generally migrate downstream in spring or fall between 1 and 3 years of age. During this time they remain close to estuaries, and subsequently migrate long distances as they grow. Males tend to grow more slowly and mature more rapidly than females, and consequently spend only 3to 9 years at sea before returning, whereas females spend 3 to 13 years at sea before returning. Mature fish are typically 15 to 20 years old. Juveniles are known to consume small fish and amphipods, while adults eat fish, shrimp, mollusks, and other large invertebrates.

Factors Affecting Southern Distinct Population of the North American Green Sturgeon

The environmental factors most likely to affect the abundance and distribution of the southern DPS of North American green sturgeon are discussed below.

Flow. Low flow rates likely reduce survival and production of the southern DPS of North American green sturgeon by hindering the dispersal of larvae to areas of greater food availability and suitable habitat, delaying the transportation of larvae downstream from water diversions in the Delta, and decreasing nutrient supply to their nurseries (DFG 1992a).

Water Temperatures. High water temperatures, which were once a problem for sturgeon in the Sacramento River, were remedied by installation of the Shasta Dam temperature control device in 1997. Although Shasta Dam has a limited storage capacity, and cold-water reserves could be depleted in long droughts, water temperatures at RBDD have not been higher than 61°F since 1995. Optimal water temperatures for development, growth and survival of green sturgeon egg and larvae are between 59 and 66°F (Mayfield and Cech 2004). Before the installation of the temperature control device, green sturgeon reproduction may have been adversely affected by temperature, potentially affecting the overall population size and age structure.

Water Quality. Contamination of the Sacramento River increased substantially in the mid-1970s when application of rice pesticides increased (USFWS 1996). White sturgeon may also accumulate polychlorinated biphenyls (PCB) and selenium (White et al. 1989). Although green sturgeon spend more time in the marine environment than white sturgeon and may have less exposure, some risk still exists from contaminants. In addition, sediments in the water during the spawning period may reduce the adhesive properties of green sturgeon eggs, which in turn may result in reduced spawning success.

Barriers to Fish Passage. The restriction of spawning to a limited area of the Sacramento River is considered the primary factor for the decline of the southern DPS of green sturgeon. Dams are impassible barriers that block access by green sturgeon to what were likely historic spawning grounds upstream (USFWS 1996). Potential barriers to migration by adult green sturgeon include the Keswick and Oroville dams, RBDD, Sacramento DWSC locks, Fremont Weir, Sutter Bypass, the DCC gates on the Sacramento River, and Shanghai Bench and the Sunset Pumps on the Feather River (70 FR 65, April 6, 2005).

Water Diversions and Exports. The threats of screened and unscreened agricultural water diversions and municipal and industrial diversions in the Sacramento River and Delta to green sturgeon are largely unknown because juvenile sturgeon are often not identified, and because current NMFS and DFG screen criteria do not address sturgeon. The high density of water diversion structures along rearing and migration routes of green sturgeon presents a potential threat; therefore, NMFS has recommended further studies (70 FR 65, April 6, 2005).

Introductions of Nonnative Species.
Several nonnative species that have been introduced into the San Francisco estuary outcompete the native species, causing a replacement in the food sources available to green sturgeon. For example, the Asian clam (*Potamocorbula amurensis*), introduced in 1988, has become the most common food of white sturgeon and was found in the only green sturgeon examined (DFG 2002). This clam is known to bioaccumulate selenium, a toxic metal that could affect the physiology of the green sturgeon (DFG 2002). Green sturgeon juveniles may also experience predation by introduced species, including striped bass.

Sportfishing. Green sturgeon are highly susceptible to mortality from sportfishing. When harvest rates are high, population recovery is slow because of the green sturgeon's slow growth rate, long life span, and age at first spawn. Protective measures have been implemented restricting harvest to sturgeon 46 to 72 inches long. Most sportfishing in the Central Valley is for white sturgeon, but green sturgeon are caught incidentally.

5.2 Essential Fish Habitat

EFH is defined as those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. EFH is the aquatic habitat (water and substrate) necessary for fish to spawn, breed, feed, or grow to maturity (50 CFR Part 227, March 19, 1988) that will allow a level of production needed to support a long-term, sustainable commercial fishery and contribute to a healthy ecosystem. The following important components of EFH must be adequate for spawning, rearing, and migration:

- Substrate composition
- Water quality
- Water quantity, depth, and velocity
- Channel gradient and stability
- Food
- Cover and habitat complexity
- Space
- Access and passage
- Habitat connectivity

The *Pacific Coast Groundfish Fishery Management Plan* has designated EFH for 83 species of groundfish, which taken together include all waters from the high-water line, and the upriver extent of saltwater intrusion in river mouths along the coast from Washington to California.

All Chinook salmon ESUs (Sacramento River winter-run, Central Valley spring-run, and Central Valley fall-/late fall-run) are included in the Pacific salmon EFH. The geographic ranges of each run overlap with the Action Area. Species descriptions for Sacramento River winter-run and Central Valley spring-run Chinook salmon are provided above, and impacts of WY 2010 Interim Flows on these species are described in Chapter 6 of this BA; therefore, these species and their impacts from WY 2010 Interim Flows are not described further. Descriptions of the effects on starry flounder and fall-/late fall-run Chinook salmon are provided below.

5.2.1 Starry Flounder

The starry flounder (*Platichthys stellatus*) is managed by the *Pacific Coast Groundfish Fishery Management Plan* of the Pacific Fishery Management Council. “Composite habitats” most important for the starry flounder are estuarine habitats (for all life stages), nonrocky shelf habitats (for juveniles and adults), and shallow coastal habitats (for eggs and larvae), as defined by the fishery management plan (Reclamation 2008). The starry flounder “Composite Estuarine EFH” overlaps the Action Area for WY 2010 Interim Flows. Therefore, the species is subject to EFH consultation (PFMC 1998).

Before the late 1980s, the starry flounder was common in both the commercial and recreational fisheries of northern and central California (DFG 2001). Historically, most of the commercial catch was made by bottom trawl, but during the 1980s, many starry flounders were also taken by gill and trammel nets in central California. During the late 1980s, commercial landings declined sharply and remained at relatively low levels through the 1990s. From 1992 through 1999, landings averaged only 62,225 pounds, ranging from a low of 25,353 pounds in 1995 to a high of 100,309 pounds in 1999. This is in contrast to annual landings of more than a million pounds during the 1970s and half a million pounds in the 1980s. The recreational catch of starry flounders is from piers, boats, and shore, usually in estuarine and adjacent coastal waters. The estimated annual recreational catch for this species in California from 1981 to 1989 averaged 40,000 fish. The recreational catches, like commercial landings, declined dramatically during the 1990s. Catch estimates from 1993 through 1999 averaged 6,000 fish per year, and ranged from a high in 1998 of 15,000 fish to lows in 1994 and 1996 of 3,000 fish.

Starry flounders range from Korea and Japan north to the Bering and Chukchi seas and the coast of Alaska to southern California, although they are uncommon south of Point Conception. The starry flounder is primarily a coastal species, living on sand and mud bottoms and avoiding rocky areas. Though found to depths of 900 feet, this species is much more common in shallower waters. Starry flounders are frequently found in bays and estuaries and are tolerant of brackish and fresh water. Tagging studies have not demonstrated extensive migrations, although there is some movement along the shore. Seasonal inshore-offshore movements of these fish possibly related to spawning are assumed to occur.

Starry flounder can be found in Suisun Bay and the lower portion of the San Joaquin River in the Delta. The distribution of the starry flounder tends to shift with growth. Young juveniles are commonly found in fresh or brackish water of Suisun Bay, Suisun Marsh, and the Delta; older juveniles range from brackish to marine water of Suisun and

San Pablo bays; and adults tend to live in shallow marine waters within and outside San Francisco Bay before returning to estuaries to spawn (Reclamation 2008).

Life History

Most spawning by the starry flounder occurs in shallow waters near the mouths of rivers and estuaries during the winter. In central California, December and January are the peak months of spawning. Metamorphosis from larvae to juvenile occurs 39–75 days after hatching. Females grow faster and reach larger sizes than do males. In central California, most males are sexually mature at 2 years and an average 14.5 inches, and most females mature at 3 years and 16 inches. The maximum size reported is 36 inches.

Starry flounder larvae feed on planktonic organisms, while young juveniles feed primarily on copepods and amphipods. As they grow, their diet changes. Five-inch fish have developed jaws and teeth that allow them to crush small clams and pull worms from their burrows. Sand dollars, brittle stars, and fish are included in the diets of larger starry flounders. Historically, in San Francisco Bay, small starry flounder fed mainly on opossum shrimp until the invasion of the overbite clam (*Potamocorbula amurensis*) caused a major reduction in shrimp abundance, forcing starry flounders to switch to a more diverse diet (Reclamation 2008). Wading and diving seabirds such as herons and cormorants, as well as marine mammals such as harbor seals, feed on juvenile starry flounders in estuaries. On occasion, a fish is caught that displays physical characteristics intermediate between a starry flounder and an English sole and may be a hybrid of those species.

Habitat Requirements

Although the starry flounder is considered a euryhaline fish, a USFWS study using fyke nets to capture salmon and striped bass took starry founder in freshwater portions of the Delta. Eighty starry flounder were taken in the San Joaquin River one-half mile downstream from the Antioch Bridge (Reclamation 2008). Salinity at this location during the April–September period of the study varied from about 0.06 to 9.0 ppt, a variation from freshwater to brackish water with salinity about one-quarter that of the ocean. One hundred ninety-three starry flounder were captured in the Sacramento River at Rio Vista, where the salinity varied from 0.02 to 0.5 ppt.

Starry flounder generally prefer tidal, low-gradient areas that have sandy or muddy bottoms (Reclamation 2008). Most found in fresh water are YOY. Abundances may be lower during dry years, but young are more likely to be found farther upstream, where they are vulnerable to entrainment by the pumps in the south Delta (Moyle 2002). The smallest fish are generally found farthest upstream, and seek areas with higher salinity as they grow (Reclamation 2008). Thus, from April to June, most YOY are living in salinities of less than 2 ppt, but by July and August they have shifted to salinities of 10 to 15 ppt. Water temperatures may also influence distribution because starry flounder are usually found at 50 to 68°F. Starry flounders less than about 8 inches in length encountered in freshwater are likely mostly migrants from salt water, rather than fish that have reared there (Moyle 2002).

In the San Francisco estuary, some smaller flounders may have originated from spawning within the estuary, but most are apparently carried into San Francisco Bay from nearshore ocean waters by strong tidal currents along the bottom (Reclamation 2008). These currents are strongest during years of high outflow from the rivers; consequently, juvenile starry flounder tend to be most abundant in the estuary during wet years (Moyle 2002). Higher abundances may be related to the greater extent of low-salinity rearing areas and the greater abundance of food organisms preferred by small flounder. Summertime abundance of YOY starry flounder in San Francisco Bay is closely related to discharge into the bay during the previous winter (Reclamation 2008).

Population Decline

No studies have been conducted to determine the population size of the starry flounder, but commercial landing and recreational catch trends suggest that the California population is now at extremely low levels. Reasons for the decline are uncertain, but fishing pressure is likely a factor. Moyle (2002) suggests that the decline may be related to changing estuarine conditions or to changes in fishing regulations that reduce catch. SWP/CVP fish salvage facilities in the Delta recorded average monthly salvage records for the starry flounder for the period from 1981 to 2002 as 187 fish per month at the CVP pumps and 77 at the SWP pumps (Reclamation 2008). The large population decline suggested by fishery trends is substantiated by a fishery-independent trawl survey conducted by DFG in the San Francisco estuary from 1980 through 1995. Results of this survey show abundance of age-0 and age-1+ starry flounder dropping dramatically during the late 1980s and remained at low levels through the 1990s (DFG 2001). Recruitment is determined largely by survival of larval and juvenile fish. Given the importance of bays and estuaries to the young of this species, the continued environmental health of these areas may be the most important factor in maintaining healthy populations of starry flounder.

5.2.2 Chinook Salmon

All four runs of Chinook salmon are included under the protection of EFH. However, effects on spring-run and winter-run resulting from the WY 2010 Interim Flows are discussed in Chapter 6 of this BA, and so are not described here.

Central Valley fall-run and late-fall-run Chinook salmon are considered by NMFS to be the same ESU (64 FR 50394–50415, September 16, 1999). Fall-run Chinook salmon is currently the most abundant and widespread salmon run in California (Mills et al. 1997). NMFS (1999) determined that listing this ESU as threatened was not warranted (64 FR 50394–50415, September 16, 1999), but subsequently classified it as a species of concern because of specific risk factors (69 FR 19975, April 15, 2004).

Fall-run Chinook salmon is currently the most abundant race of salmon in California (Mills et al. 1997). In the San Joaquin River Basin, fall-run Chinook salmon historically spawned in the mainstem San Joaquin River upstream from the Merced River confluence and in the mainstem channels of the major tributaries. Dam construction and water diversion dewatered much of the mainstem San Joaquin River, limiting fall-run Chinook salmon to the three major tributaries, where they currently spawn and rear downstream from mainstem dams.

Estimates of fall-run Chinook salmon are available from 1940, but systematic counts of salmon in the San Joaquin Basin began in 1953, long after construction of large dams on the basin's major rivers. Comparable estimates of population size before 1940 are not available. Since population estimates began, the number of fall-run Chinook salmon returning to the San Joaquin Basin annually has fluctuated widely. Most recently, escapement in the Tuolumne River dropped from a high of 40,300 in 1985 to a low of about 100 as a result of the 1987 through 1992 dry period (EA 1997). With increased precipitation and improved flow conditions, escapement increased to 3,300 in 1996 (EA 1997). Since 1991, hatchery production is estimated to compose about 30–60 percent of the fall-run Chinook run in the San Joaquin Basin (Yoshiyama, Fisher, and Moyle 1998).

Production of fall-run Chinook salmon in the three tributaries is believed to be limited by habitat conditions for rearing juveniles and outmigrating smolts (SJRRP 2007a). Population analyses conducted for fall-run Chinook salmon in the Stanislaus and Tuolumne rivers indicate that the quality of the juvenile rearing and migratory habitats controls the production of adult salmon in these rivers. Moreover, the analyses show that the most important environmental factor that affects the survival of the juveniles and smolts is streamflow during the late winter and spring. Since the 1940s, production of fall-run Chinook salmon in the two rivers has been highest during wet years, characterized by high flows from February through June, when juvenile salmon rear and migrate.

Life History

Except for timing, the life-history characteristics and habitat requirements for fall-/late fall-run Chinook salmon are similar to those for both spring- and winter-run Chinook salmon. The differences are described below.

Migration by fall-run adults to spawning habitat, and thus through the Delta, is typically initiated around June and continues through December, but peaks in October and November. Spawning takes place primarily between October and December. Late fall-run Chinook salmon adults migrate upstream between late October and April, and spawn from January through April.

Fall-run salmon fry disperse downstream from early January through mid-March, whereas the smolts primarily migrate between late March and mid-June in the Stanislaus River (SJRRP 2007b). Late fall-run, however, begin outmigration between after rearing in freshwater for 7 to 13 months.

Fall-run smolts enter the San Francisco estuary primarily in May and June (MacFarlane and Norton 2002), where they spend days to months completing the smoltification process in preparation for ocean entry and feeding (Independent Scientific Group 1996). Within the estuarine habitat, movements by juvenile Chinook salmon are dictated by the tidal cycles, following the rising tide into shallow-water habitats from the deeper main channels, and returning to the main channels when the tide recedes (Levy and Northcote 1981, Healey 1991).

Juvenile Chinook salmon spent an average of about 40 days migrating through the Delta to the mouth of San Francisco Bay in spring 1997, but grew little in length or weight until they reached the Gulf of the Farallon Islands (MacFarlane and Norton 2002).

Based on the mainly ocean-type life history observed (i.e., fall-run Chinook salmon), MacFarlane and Norton (2002) concluded that unlike other salmonid populations in the Pacific Northwest, Central Valley Chinook salmon show relatively little estuarine dependence and may benefit from expedited ocean entry. It is possible that the absence of extensive marsh habitats outside of Suisun and San Pablo bays and the introduction of exotic species of zooplankton limit important food resources in the San Francisco estuary that are present in other Pacific Northwest estuaries (MacFarlane and Norton 2002).

When fall-run Chinook salmon produced from the Sacramento–San Joaquin system enter the ocean, they appear to head north and rear off the Northern California/southern Oregon coast (Cramer 1987). Fall-run Chinook typically rear in coastal waters early in their ocean life. Ocean conditions are likely an important cause of density-independent mortality and interannual fluctuations in escapement sizes. Central Valley Chinook salmon typically spend 2 to 4 years at sea (Mesick and Marston 2007). Most mortality experienced by salmonids during the marine phase occurs soon after ocean entry (Pearcy 1992, Mantua et al. 1997).

5.3 Terrestrial Species

5.3.1 Plants

Known occurrences of federally listed plant species near the Restoration Area are shown in Exhibits 2a–2c (CNDDB 2009).

Succulent Owl's-Clover

Succulent owl's-clover (*Castilleja campestris* ssp. *succulenta*), which is Federally listed as threatened, occurs in vernal pool habitat, often in acidic conditions. It is discontinuously distributed through the southern Sierra Nevada foothills and eastern San Joaquin Valley in Fresno, Madera, Merced, Mariposa, San Joaquin, and Stanislaus counties at elevations of 160 to 2,500 feet above mean sea level. It has been documented in the vicinity of, but not within, the Restoration Area, with two occurrences documented just outside of the Restoration Area boundary in Reach 1 (CNDDB 2009). One of these occurrences was last observed in 1938 and may be extirpated because the site had been disked and the species was absent when a visit to relocate the occurrence was made in 1981. Critical habitat for succulent owl's-clover is designated in and immediately adjacent to the Restoration Area in Reach 1A (Figure 5-1). Urbanization, agriculture, and flood control are the primary threats to this species (CNPS 2009). Grazing and trampling are frequently suggested as threats, but some level of grazing may benefit this species by controlling nonnative competitors. Succulent owl's-clover is covered by the *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon* (USFWS 2005) and recovery units include portions of the Action Area (Figure 5-2). This recovery plan addresses a large number of vernal pool–associated species through an ecosystem approach to recovery that is focused on habitat protection and management. This species has been or is proposed to be covered by several regional HCPs.

Hoover's Spurge

Hoover's spurge (*Chamaesyce hooveri*), which is Federally listed as threatened, is discontinuously distributed in the Central Valley in Tehama, Glenn, Butte, Colusa Stanislaus, Merced, and Tulare counties. Its elevation range is 80–820 feet above mean sea level. Hoover's spurge, a small, prostrate annual herb species, is found in relatively large, deep vernal pools among the rolling hills, remnant alluvial fans, and depositional stream terraces of the eastern Sacramento and San Joaquin valleys (Stone et al. 1988 cited in USFWS 2005). It has been documented in the vicinity of, but not in, the Restoration Area. Critical habitat for Hoover's spurge is designated in and immediately adjacent to the Restoration Area in Reaches 4B1 and 4B2 (Figure 5-1). Conversion of habitat to agricultural land uses, competition from nonnative species, and grazing are recognized as threats to Hoover's spurge (CNPS 2009), although some level of grazing may benefit this species by controlling nonnative competitors. Hoover's spurge is covered by the *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon* (USFWS 2005) and recovery units include portions of the Action Area (Figure 5-2). This recovery plan addresses a large number of vernal pool–associated species through an ecosystem approach to recovery that is focused on habitat protection and management. This species has been or is proposed to be covered by several regional HCPs.

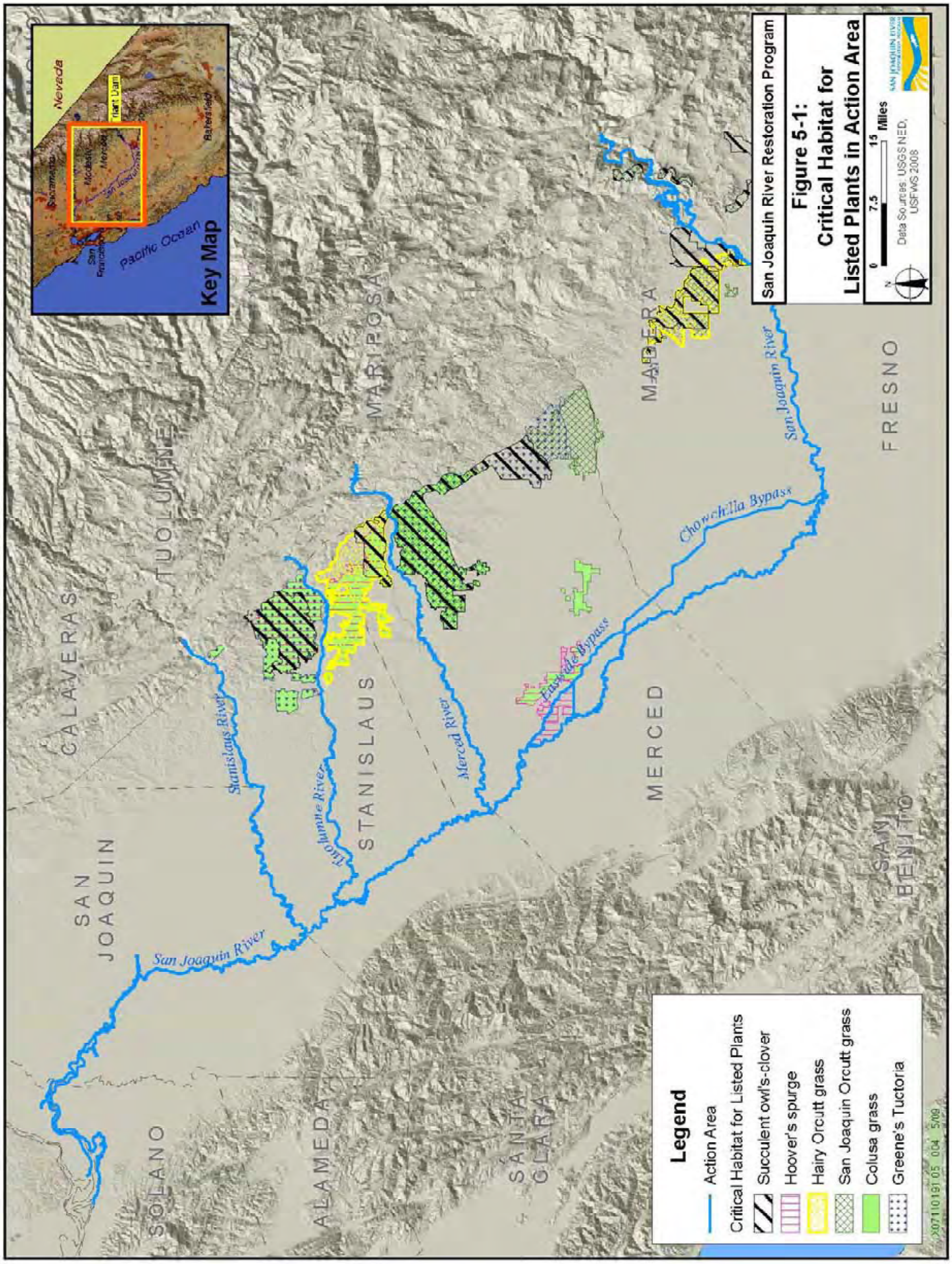


Figure 5-1.
Critical Habitat for Listed Plants in Action Area

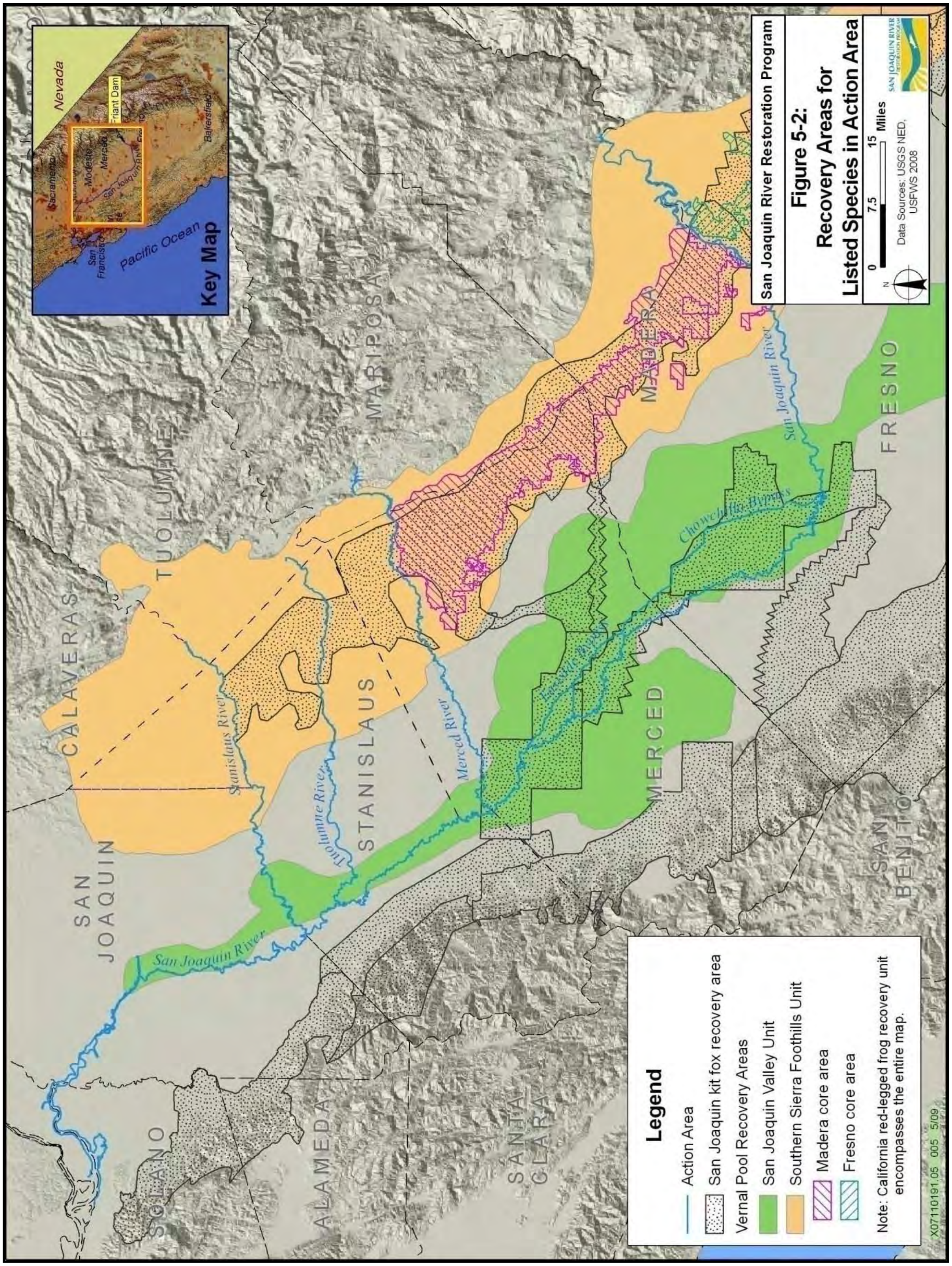


Figure 5-2.
Recovery Areas for Listed Species in Action Area

Palmate-Bracted Bird's-Beak

Palmate-bracted bird's-beak is Federally listed as endangered, with only seven known populations: four in the Sacramento Valley, one in the Livermore Valley, and two in the San Joaquin Valley. The elevation range of this species is 15 to 500 feet above mean sea level. Palmate-bracted bird's-beak grows in alkaline soils in chenopod scrub and valley and foothill grassland habitat, primarily at the edges of channels, with individuals scattered in seasonally wet depressions, alkali scalds, and grassy areas (USFWS 1998a, cited in McBain and Trush 2002). It has been documented in the vicinity of, but not in, the Restoration Area, including at the Alkali Sink Ecological Area and Mendota NWR, approximately 4 miles south of Reach 2A, and between the San Joaquin River and the Chowchilla Bypass near Reach 3. This plant species is threatened by agricultural conversion, urbanization, industrial development, off-road vehicles, modified hydrology, and grazing. This species is covered by the *Recovery Plan for Upland Species of the San Joaquin Valley, California* (USFWS 1998a) and recovery units include portions of the Action Area (Figure 5-2). The recovery strategy for this species is focused on maintaining self-sustaining populations in preserved areas, protecting existing populations on private land, surveying historical occurrences, and reintroducing the species in areas where it has been extirpated.

Colusa Grass

Colusa grass (*Neostapfia colusana*), which is Federally listed as threatened, is known from approximately 40 populations in Merced, Stanislaus, Solano, and Yolo counties, including occurrences in and near the Arena Plains Unit of the San Luis NWR Complex. It has been found in northern claypan and northern hardpan pool types at elevations ranging from 15 to 4,000 feet above mean sea level. It grows in large or deep vernal pools that retain water until late spring (Stone et al. 1988 cited in USFWS 2005); these pools usually have adobe clay soils. It has been documented in the vicinity of, but not in, the Restoration Area. Critical habitat is designated for this species and is located in and adjacent to Reaches 4B1 and 4B2 (Figure 5-1). The biggest threat to survival of Colusa grass is conversion of habitat to agricultural land uses. Development, flood control, overgrazing, and competition from nonnative species are also recognized threats. Other observed threats at specific sites include poultry manure, herbicides, and groundwater contamination by industrial chemicals (USFWS 2005). Colusa grass is covered by the *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon* (USFWS 2005) and recovery units include portions of the Action Area (Figure 5-2). This recovery plan addresses a large number of vernal pool–associated species through an ecosystem approach to recovery that is focused on habitat protection and management. This species has been or is proposed to be covered by several regional HCPs.

San Joaquin Valley Orcutt Grass

San Joaquin Valley Orcutt grass (*Orcuttia inaequalis*), which is Federally listed as endangered, is restricted to the vernal pool region of the eastern San Joaquin Valley, from Stanislaus County to Tulare County, at elevations up to 2,500 feet. San Joaquin Valley Orcutt grass, a small, grayish green, tufted annual of the grass family, is found on alluvial fans, stream terraces, and tabletop lava flows in northern claypan, northern hardpan, and northern basalt flow vernal pools. The species grows primarily in large pools that retain water until late spring (Stone et al. 1988 cited in USFWS 2005). Most of the extant occurrences are concentrated in two small areas of eastern Merced County: an occurrence that overlaps with the Restoration Area in Reach 1A and another that is just outside the Restoration Area boundary on the east side of Friant Road. Survival of San Joaquin Valley Orcutt grass is seriously threatened by agricultural conversion, urbanization, overgrazing, channelization and other hydrological modifications, and competition from nonnative plants (CNPS 2009, USFWS 2005). Grasshopper herbivory during large outbreaks threatens some populations. Critical habitat for this species is designated immediately adjacent to Reach 1A (Figure 5-1). San Joaquin Valley Orcutt grass is covered by the *Plan for Vernal Pool Ecosystems of California and Southern Oregon* (USFWS 2005) and recovery units include portions of the Action Area (Figure 5-2). This recovery plan addresses a large number of vernal pool–associated species through an ecosystem approach to recovery that is focused on habitat protection and management. This species has been or is proposed to be covered by several regional HCPs.

Hairy Orcutt Grass

Hairy Orcutt grass (*Orcuttia pilosa*), which is Federally listed as endangered, has a discontinuous distribution through the Central Valley and southern Sierra Nevada foothills, with populations in the north in Tehama, Glenn, and Butte counties and southern populations in Madera, Merced, and Stanislaus counties. Its elevation range is 175–650 feet above mean sea level. This species is found in vernal pools in undulating topography on remnant alluvial fans and stream terraces. The species grows primarily in large pools that retain water until late spring (Stone et al. 1988 cited in USFWS 2005). It has been documented in the vicinity of the Restoration Area in the Gregg, Herndon, Lanes Bridge, and Madera quadrangles. There are no known occurrences in the Restoration Area; the nearest documented occurrence (CNDDB Occurrence 28) is located approximately 3,000 feet outside the Reach 1A boundary. Critical habitat for this species is designated in and immediately adjacent to Reach 1A (Figure 5-1). The biggest threats to the survival of hairy Orcutt grass are habitat conversion to agricultural uses and development (CNPS 2009). Cattle grazing and competition from nonnative species are additional recognized threats. Some populations are vulnerable to extinction from random catastrophic events (e.g., fire, flood, insect infestations) because of their small sizes. Hairy Orcutt grass is covered by the *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon* (USFWS 2005) and recovery units include portions of the Action Area (Figure 5-2). This recovery plan addresses a large number of vernal pool–associated species through an ecosystem approach to recovery that is focused on habitat protection and management. This species has been or is proposed to be covered by several regional HCPs.

Greene’s Tuctoria

Greene’s tuctoria (*Tuctoria greenei*), which is Federally listed as endangered, is discontinuously distributed throughout the Central Valley and Sierra Nevada foothills, with populations in Shasta, Tehama, Butte, Glenn, and Merced counties. Historically, this species also was found in San Joaquin, Stanislaus, Madera, and Tulare counties, but known occurrences in these counties are believed to be extirpated (USFWS 2005). There is a single population of this species in Shasta County at an elevation of 3,500 feet, but the remaining current and historically known occurrences range in elevation from 110 to 440 feet above mean sea level. This species is found in northern hardpan, northern claypan, and northern basalt flow vernal pools of intermediate size and typically is found in shallower pools than other species in the Orcuttiaea tribe (i.e., grasses in the Orcutt tribe, which also includes the Orcutt grasses and Colusa grass) or grows at the shallow edges of deeper pools (USFWS 2005). Greene’s tuctoria has not been documented in the Action Area, but it was historically known from vernal pool habitat near the Stanislaus and Tuolumne rivers, and critical habitat for this species has been designated in the Action Area along these rivers (Figure 5-1). As with other vernal pool plant species, the biggest threat to Greene’s tuctoria is loss of habitat related to agricultural and urban land use conversion. Grasshopper infestations also may pose a threat to this species (USFWS 2005). Observers have documented entire populations of Greene’s tuctoria being eaten by grasshoppers before they were able to produce seed (Griggs 1980, cited in USFWS 2005; Griggs and Jain 1983, cited in USFWS 2005; Stone et al. 1988, cited in USFWS 2005). Greene’s tuctoria is covered by the *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon* (USFWS 2005) and recovery units include portions of the Action Area (Figure 5-2). This recovery plan addresses a large number of vernal pool–associated species through an ecosystem approach to recovery that is focused on habitat protection and management. This species has been or is proposed to be covered by several regional HCPs.

5.3.2 Wildlife

Known occurrences of federally listed wildlife species near the Restoration Area are shown in Exhibits 3a-c (CNDDB 2009).

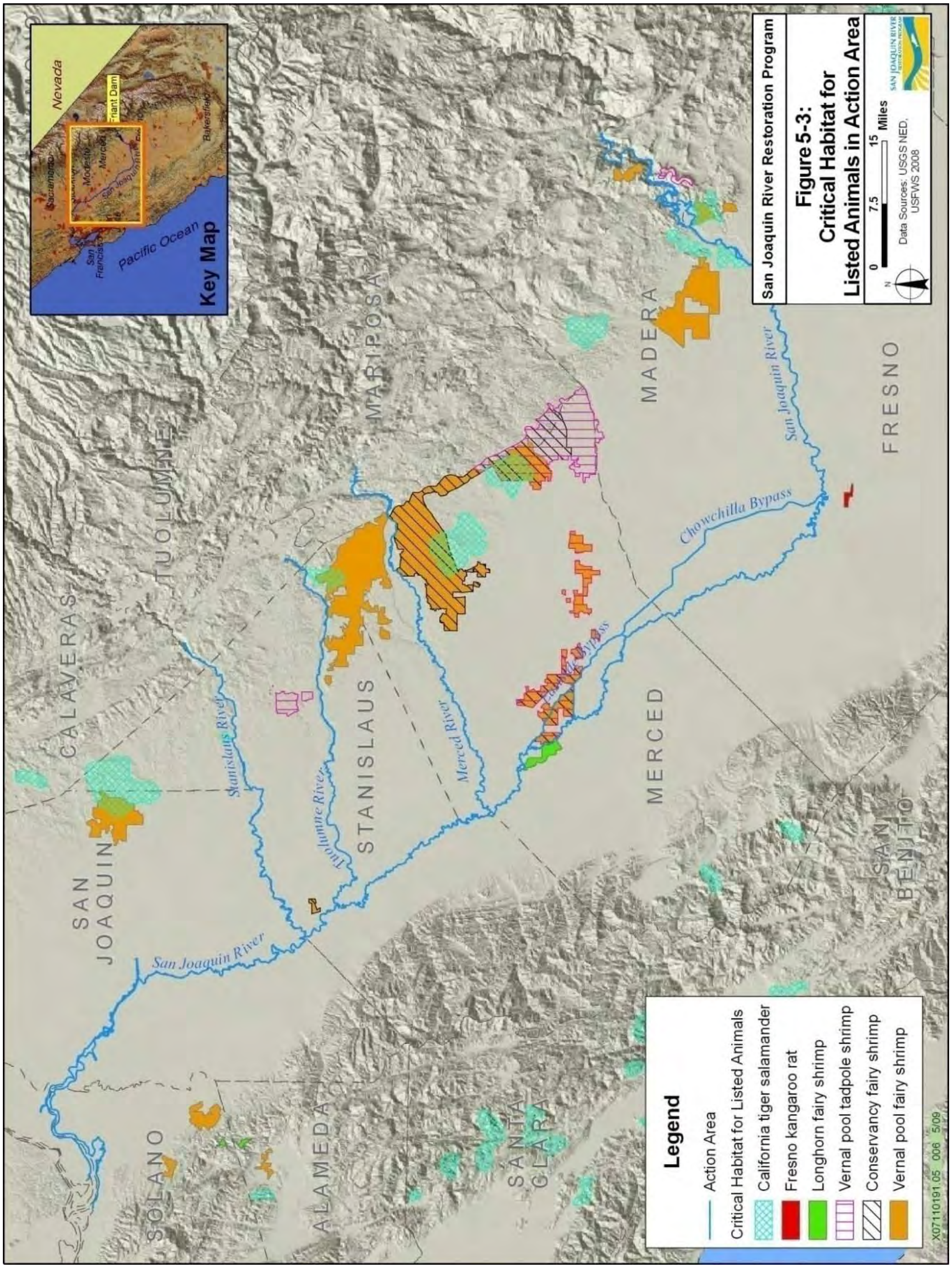


Figure 5-3.
Critical Habitat for Listed Animals in Action Area

Conservancy Fairy Shrimp

Conservancy fairy shrimp (*Branchinecta conservation*) is Federally listed as endangered. Its range extends from the northern Sacramento Valley to the San Joaquin Valley. Conservancy fairy shrimp occurs in vernal pools, swales, and lakes (Helm 1998) that are relatively large (more than several acres in size) and turbid (Eriksen and Belk 1999, Helm 1998, King 1996). It is known to occur in suitable habitat in the San Luis NWR Complex in Reaches 4B2 and 5 and the Eastside Bypass. Designated critical habitat for this species is in and adjacent to the Chowchilla Bypass, the Eastside Bypass, the Mariposa Bypass, and Reaches 4B2 and 5 (Figure 5-3). Vernal pool and seasonal wetlands suitable for this species are not likely to be present in the San Joaquin River corridor (e.g., between the existing banks or levees) of the Restoration Area. The presence of suitable vernal pool or seasonal wetland habitat in the Chowchilla, Eastside, and Mariposa bypasses is unknown. Although these bypasses were created in uplands that historically contained northern claypan vernal pools, land conversion for agricultural development and the subsequent hydrologic modification related to creating the bypasses and agricultural diversions and discharge have eliminated natural vernal pools from many areas. However, because of the high clay content of soils in the area, depressions caused by previous construction activities in upland habitats still tend to hold rainwater for an extended period, so soil and hydrologic conditions may be suitable to support vernal pool invertebrates in some areas. As suggested by a reconnaissance-level survey of the Eastside Bypass conducted in February and March 2000 (DFG 2000), existing conditions in these low-flow channel bypasses are unlikely to be suitable for vernal pool invertebrates because the channel is regularly inundated during seasonal flood flows.

The Conservancy fairy shrimp is threatened primarily by the habitat loss and fragmentation resulting from expansion of agricultural and developed land uses. Vernal pool habitat also can be lost or degraded by other activities that damage or puncture the hardpan (i.e., water-restrictive layer underlying the pool) or by activities that destroy or degrade uplands that contribute water to vernal pools. In addition to habitat conversion, activities causing such loss or degradation include deep ripping of soils; water diversion or impoundment; and application of pesticides, fertilizers, or livestock wastes. Additional threats are incompatible grazing practices, replacement of native plants by nonnatives, and introduction of fish to vernal pools (Robins and Vollmar 2002, Marty 2005, Pyke and Marty 2005, USFWS 2005). The Conservancy fairy shrimp is covered by the *Plan for Vernal Pool Ecosystems of California and Southern Oregon* (USFWS 2005) and recovery units include portions of the Action Area (Figure 5-2). This recovery plan addresses a large number of vernal pool–associated species through an ecosystem approach to recovery that is focused on habitat protection and management. This species has been or is proposed to be covered by several regional HCPs.

Longhorn Fairy Shrimp

Longhorn fairy shrimp (*Branchinecta longiantenna*) is Federally listed as endangered. Its known distribution extends from Contra Costa and Alameda counties to San Luis Obispo County and also includes Merced County (USFWS 2005, CNDDB 2009). Within this geographic range, it is extremely rare in vernal pools and swales. This species is known to occur in suitable habitat in the San Luis NWR Complex in Reach 5. Designated critical habitat for this species is in and adjacent to Reaches 4B2 and 5 (Figure 5-3). Similar to the Conservancy fairy shrimp, vernal pool and seasonal wetlands suitable for this species are not likely to be present in the San Joaquin River corridor (e.g., between the existing banks or levees) of the Restoration Area or in the Chowchilla, Eastside, and Mariposa bypasses.

The longhorn fairy shrimp has likely experienced habitat loss and fragmentation as a result of the expansion of agricultural and developed land uses. However, it is now threatened by habitat loss and disturbance resulting from several site-specific activities at the few locations from which it is known: wind energy development, a water storage project, construction of a dirt access road, and land management activities (USFWS 2005). Additional threats to longhorn fairy shrimp may include incompatible grazing practices and replacement of native plants by nonnatives (Robins and Vollmar 2002, Marty 2005, Pyke and Marty 2005). Similar to the Conservancy fairy shrimp, the longhorn fairy shrimp is covered by the *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon* (USFWS 2005) and recovery units include portions of the Action Area (Figure 5-2). In addition, much of the species' known occupied habitat has been partially or fully protected on land managed by the East Bay Regional Park District, USFWS, and the Carrizo Plain National Monument.

Vernal Pool Fairy Shrimp

Vernal pool fairy shrimp (*Branchinecta lynchi*), which is Federally listed as threatened, is found throughout the Central Valley and west to the central Coast Ranges, at sites 30 to 4,000 feet in elevation (USFWS 2005). The species has also been reported from the Agate Desert region of Oregon near Medford, and disjunct populations occur in San Luis Obispo, Santa Barbara, and Riverside counties. Within this geographic range, the vernal pool fairy shrimp inhabits primarily vernal pools (Eng, Belk, and Eriksen 1990). It also occurs in other wetlands that provide habitat similar to vernal pools: alkaline rain-pools, ephemeral drainages, rock outcrop pools, ditches, stream oxbows, stock ponds, vernal swales, and some seasonal wetlands (Helm 1998). Occupied wetland habitats range in size from several square feet to more than 10 acres. This species is not found in riverine or other permanent waters. The vernal pool fairy shrimp is known to occur in suitable habitat in the San Luis NWR Complex in Reaches 4B1, 4B2, and 5 and in the Chowchilla and Eastside bypasses. Critical habitat for this species is near Reach 1A and adjacent to the Chowchilla Bypass, the Eastside Bypass, the Mariposa Bypass, and Reaches 4B2 and 5 (Figure 5-3). Similar to the Conservancy fairy shrimp, vernal pool and seasonal wetlands suitable for this species are not likely to be present in the San Joaquin River corridor (e.g., between the existing banks or levees) Restoration Area or in the Chowchilla, Eastside, and Mariposa bypasses. The threats to the survival of the vernal pool fairy shrimp are similar to those of the Conservancy fairy shrimp, described above. Similarly, the vernal pool fairy shrimp is covered by the *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon* (USFWS 2005) and recovery units include portions of the Action Area (Figure 5-2). The vernal pool fairy shrimp has been or is proposed to be covered by several regional HCPs.

Vernal Pool Tadpole Shrimp

The vernal pool tadpole shrimp (*Lepidurus packardi*), which is Federally listed as endangered, is endemic to the Central Valley, with most populations in the Sacramento

Valley. This species has also been reported from the Delta to the east side of San Francisco Bay, and from scattered localities in the San Joaquin Valley from San Joaquin County to Madera County (Rogers 2001). Within this geographic range, vernal pool tadpole shrimp occurs in a wide variety of seasonal habitats: vernal pools, ponded clay flats, alkaline pools, ephemeral stock tanks, and roadside ditches (CNDDB 2009, Helm 1998, Rogers 2001). Habitats where vernal pool tadpole shrimp have been observed range in size from small, clear, vegetated vernal pools to highly turbid pools to large winter lakes (Helm 1998, Rogers 2001). This species has not been reported in pools that contain high concentrations of sodium salts but may occur in pools with high concentrations of calcium salts. Vernal pool tadpole shrimp is known to occur in suitable habitat in the San Luis NWR Complex and at the Great Valley Grasslands State Park in Reaches 4B1, 4B2, and 5 and the Chowchilla and Eastside Bypasses. Critical habitat for this species is in and adjacent to the Chowchilla Bypass, the Eastside Bypass, the Mariposa Bypass, and Reaches 4B2 and 5 (Figure 5-3). Similar to the Conservancy fairy shrimp, vernal pool and seasonal wetlands suitable for this species are not likely to be present in the San Joaquin River corridor (e.g., between the existing banks or levees) of the Restoration Area or in the Chowchilla, Eastside, and Mariposa bypasses. The threats to the survival of the vernal pool tadpole shrimp are similar to those of the Conservancy fairy shrimp, described above. Similarly, the vernal pool tadpole shrimp is covered by the *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon* (USFWS 2005) and recovery units include portions of the Action Area (Figure 5-2). This species has been or is proposed to be covered by several regional HCPs.

Valley Elderberry Longhorn Beetle

Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*) is Federally listed as threatened; however, in 2006, USFWS recommended that this species be delisted (USFWS 2006d). This beetle is endemic to the Central Valley. It is found only in association with its host plants, the elderberry shrub (*Sambucus* spp.). In the Central Valley, the elderberry shrub is found primarily in riparian vegetation. The valley elderberry longhorn beetle is known to occur in elderberry shrubs present in the riparian woodland in Reaches 1A and 2. The species is also expected to occur in suitable habitat in other locations in the Restoration Area. Elderberry shrubs are associated with riparian habitats and typically are located on the higher portions of levees and streambanks, which are not subject to inundation or scouring, although some elderberry shrubs in the Action Area were noted to be growing along the channel (ESRP 2004, 2006). This species has experienced substantial loss of riparian habitat containing its host plant, and damage and loss of host plants in remaining habitat. However, its greatest current threat may be predation and displacement by the invasive Argentine ant (*Linepithema humile*) (Huxel 2000). A recovery plan was prepared for this species during the 1980s (USFWS 1984), and regularly implemented conservation measures have included avoidance and minimization of effects on occupied habitat, elderberry transplantation and replacement plantings, and habitat preservation. In part as a result of these measures, extensive areas of habitat have been preserved (USFWS 2006d). As noted above, the species has been recommended for delisting.

California Tiger Salamander

California tiger salamander (*Ambystoma californiense*) is Federally listed as threatened throughout its range except in Sonoma and Santa Barbara counties, where it is listed as endangered (69 FR 47212–47248, 70 FR 49379–49458). The Proposed Action is located within the range of the central population of California tiger salamander (70 FR 49379–49458). The species, endemic to California, ranges across the Central Valley and the eastern foothills of the Sierra Nevada from Yolo County (possibly up to Colusa County) south to Kern County, and coastal grasslands from Sonoma County to Santa Barbara County at elevations ranging from approximately 10 to 3,500 feet above mean sea level (Shaffer and Fisher 1991). The California tiger salamander requires vernal pools, ponds (natural or human made), or semipermanent calm waters (where ponded water is present for a minimum of 3–4 months) for breeding and larval maturation. It also requires adjacent upland areas that contain small-mammal burrows or other suitable refugia for aestivation. Surveys have detected the presence of this species at the West Bear Creek Unit of the San Luis NWR Complex and at Great Valley Grasslands State Park (McBain and Trush 2002). Critical habitat for this species is in and adjacent to Reach 1A (Figure 5-3).

The alteration of either breeding ponds or upland habitat through the introduction of exotic predators (e.g., bullfrogs [*Rana catesbeiana*] and mosquitofish [*Gambusia affinis*]) or the construction of barriers that fragment habitat and reduce connectivity (e.g., roads, berms, and certain types of fences) can be detrimental to the survival of the California tiger salamander (Jennings and Hayes 1994; Trenham, Koenig, and Shaffer 2001). Other threats include vehicular-related mortality, especially during breeding migrations (Barry and Shaffer 1994), and rodent-control programs, which lead to loss of aestivation habitats (Loredo, Van Vuren, and Morrison 1996). A recovery plan for California tiger salamander has not been prepared, and this species is not covered by the *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon* (USFWS 2005). However, the recovery plan addresses a large number of vernal pool-associated species through an ecosystem approach focused on habitat protection and management. Thus, the California tiger salamander likely will benefit from many of these recovery actions.

Blunt-Nosed Leopard Lizard

Blunt-nosed leopard lizard (*Gambelia sila*), which is Federally listed as endangered, was historically found throughout the San Joaquin Valley and adjacent foothills, from San Joaquin County to eastern San Luis Obispo County. It currently occupies isolated and scattered areas of undeveloped habitat on the San Joaquin Valley floor and in the eastern foothills of the Coast Ranges. Blunt-nosed leopard lizards are found in areas with sandy soils and scattered vegetation and usually are absent from thickly vegetated habitats (DFG 1992b). On the floor of the San Joaquin Valley, they usually are found in nonnative grassland, valley sink scrub habitats, valley needlegrass grassland, alkali playa, and valley saltbush scrub (USFWS 1998a). There are several records of this species occurring near Mendota Pool. This species is also known to occur in the Chowchilla Bypass and could occur in the Eastside and Mariposa bypasses if suitable habitat is present. It is not expected to occur in the San Joaquin River corridor or the existing low-flow channel of the bypasses because these areas are regularly inundated during seasonal flood flows.

Habitat disturbance, fragmentation, and loss are the greatest threats to populations of blunt-nosed leopard lizard (USFWS 1998a). Cultivation, habitat modification for petroleum and mineral extraction; pesticide applications; use of off-road vehicles; and construction for transportation, communication, and irrigation infrastructure all have caused pervasive habitat disturbance, fragmentation, and loss throughout the San Joaquin Valley (Stebbins 1954; Montanucci 1965; USFWS 1980, 1985a; Germano and Williams 1993). These activities present ongoing threats to the survival of blunt-nosed leopard lizards (USFWS 1998a). A recovery plan was prepared by USFWS in 1980 and revised in 1985 (USFWS 1985b) and 1998 (USFWS 1998a). Conservation efforts have included habitat and population surveys, studies of population demographics, habitat management, land acquisition, and development of management plans for public lands (USFWS 1998a). Current recovery efforts focus on three important factors: (1) determining appropriate habitat management and compatible land uses for blunt-nosed leopard lizards, (2) protecting additional habitat for the species in key locations of its range, and (3) determining more precisely how populations are affected by environmental variation (USFWS 1998a).

Giant Garter Snake

Giant garter snake (*Thamnophis gigas*), which is Federally listed as threatened, historically occurred throughout the Central Valley of California, but the current range of the species is confined to the Sacramento Valley, isolated sites in the San Joaquin Valley, and potentially in the Delta (Hansen and Brode 1980; Stebbins 2003; USFWS 1999a, 1999b). It inhabits sloughs, low-gradient streams, marshes, ponds, agricultural wetlands (e.g., rice fields), irrigation canals and drainage ditches, and adjacent uplands. Although many of the populations of giant garter snake in the northern part of the range from Stockton (San Joaquin County) to Chico (Butte County) are relatively stable, the southernmost populations at the Mendota Wildlife Area (Fresno County) and the Grassland Wetlands (Merced County) are small, fragmented, unstable, and probably decreasing (USFWS 2006b). No sightings of giant garter snakes south of the Mendota Wildlife Area, in the historically known range of the species, have occurred since the time of listing (Hansen 2002).This species has been observed at the San Luis, Kesterson, and West Bear Creek units of the San Luis NWR Complex and documented in the Mendota Wildlife Area (Dickert 2005) and south of the San Joaquin River in Fresno Slough (USFWS 2006b).

Giant garter snake is threatened primarily by habitat conversion, fragmentation, and degradation resulting from urban development (58 FR 54053–54065, October 20, 1993; Dickert 2005). It is also threatened by incompatible agricultural practices, such as intensive vegetation control along canal banks and changes in crop composition. This species is susceptible to predation by native and nonnative species. It is also affected by parasites and contaminants. A draft recovery plan prepared for this species (USFWS 1999a, 1999b) is being updated and finalized. The Restoration Area is located in the San Joaquin Valley Recovery Unit (see Figure 5-2), as described in the draft recovery plan for the species. Recovery plan recommendations for this area include developing and implementing a management plan benefiting giant garter snake, restoring wetland habitat for this species, and maintaining compatible agricultural practices.

Western Yellow-Billed Cuckoo

Western yellow-billed cuckoo (*Coccyzus americanus occidentalis*), which is a candidate species for Federal listing, breeds throughout much of North America and winters in South America (Hughes 1999). The California breeding range of western yellow-billed cuckoo is restricted to the Sacramento Valley, the South Fork of the Kern River, the lower Colorado River Valley, and sometimes the Prado Basin in Riverside and San Bernardino counties (Gaines and Laymon 1984). Most recent Sacramento Valley records are from the Sacramento River, from Todd Island in Tehama County south to Colusa State Park in Colusa County, and from the Feather River in Yuba and Sutter counties (Gaines and Laymon 1984). Yellow-billed cuckoo nest sites are associated with large and wide patches of riparian habitat (Laymon and Halterman 1989). In the western United States, yellow-billed cuckoos breed in broad, well-developed, low-elevation riparian woodlands composed primarily of mature cottonwoods (*Populus* spp.) and willows (*Salix* spp.), although they have also been observed nesting in orchards adjacent to riparian habitats (Gaines and Laymon 1984). Typical nest sites in California have moderately high canopy closure and low total ground cover and are close to water (Laymon and Halterman 1987). In the late 1960s, a few yellow-billed cuckoos were observed regularly near the confluence of the Tuolumne and San Joaquin rivers, but this area was subsequently subject to intensive logging, and no cuckoos have been observed in recent years (Reeve, pers. comm., 1998, cited in McBain and Trush 2002). The yellow-billed cuckoo has been considered a rare migratory species during spring in Stanislaus County (Reeve 1988). This species has potential to nest in suitable habitat in the Restoration Area.

In California, yellow-billed cuckoo is threatened by the loss or degradation of suitable large tracts of riparian habitat, pesticide poisoning, and possibly reduced prey abundance resulting from widespread application of pesticides (Gaines and Laymon 1984). Conservation projects of the CVP have preserved habitat for yellow-billed cuckoo (DFG 2005). This species also has been included in habitat conservation and multispecies conservation planning efforts in southern California. These efforts have focused on conserving suitable breeding habitat by preserving and restoring large patches of riparian vegetation.

Least Bell's Vireo

Least Bell's vireo (*Vireo bellii pusillus*), which is Federally listed as endangered, is a neotropical migrant species and is found in California and other states in the southwest and central western United States during the breeding season and during migration. This species nests in dense, low, shrubby vegetation, generally early successional stages in riparian areas, particularly cottonwood-willow forest but also brushy fields, young second-growth forest or woodland, scrub oak, coastal chaparral, and mesquite brushlands, often near water in arid regions (Brown 1993). Formerly, the vireo was known to breed throughout the Sacramento and San Joaquin valleys, in the Sierra Nevada foothills, and in the Coast Ranges. It historically nested throughout riparian areas in the Central Valley and in other low-elevation riparian zones in California (RHJV 2004). The species was characterized as abundant at one time, but by 1980, it was extirpated from the entire Central Valley, and it is now absent from most of its historical range (RHJV 2004). Critical habitat for least Bell's vireo was designated in 1994 (59 FR 4845–4867, February

2, 1994). This critical habitat is located in southern California and does not include areas in the San Joaquin Valley. However, recent observations indicate that the species' range is expanding northward and that individuals are recolonizing areas that have been unoccupied for decades (RHJV 2004). Least Bell's vireos successfully nested at the San Joaquin River NWR in 2005 and 2006 (USFWS 2006c).

The primary threats to the least Bell's vireo are habitat loss and brood parasitism by the brown-headed cowbird (which is increased in areas with livestock) (RHJV 2004, USFWS 2006c). Threats also include habitat degradation caused by trampling of vegetation and nests by livestock and recreational activities, and habitat degradation resulting from the spread of invasive plants, in particular giant reed (*Arundo donax*). USFWS has prepared a draft recovery plan for least Bell's vireo (USFWS 1998b). Least Bell's vireo is also addressed in most habitat conservation and multiple species planning efforts in southern California (DFG 2005), including the *Coachella Valley Multi-Species Habitat Conservation Plan*, *Western Riverside Multi-Species Habitat Conservation Plan*, *Camp Pendleton Resource Management Plan*, and *Orange County Natural Community Conservation Plan*. Recovery and management recommendations in these plans include continuing cowbird removal programs, nest monitoring for cowbird parasitism, and restoration of riparian vegetation. Resolution of land use conflicts, such as those related to livestock grazing in riparian corridors, water diversion, and developed parks adjacent to suitable vireo habitat, will require additional planning and management actions.

Riparian Brush Rabbit

Riparian brush rabbit (*Sylvilagus bachmani riparius*), which is Federally listed as endangered, inhabits riparian vegetation along the lower portions of the San Joaquin and Stanislaus rivers in the northern San Joaquin Valley. Although definitive information on its former distribution is lacking, the range of this subspecies probably extended farther upstream than the Merced River, assuming that suitable habitat historically occurred along the length of the San Joaquin River system (Williams and Basey 1986). The riparian brush rabbit is restricted to several populations at Caswell Memorial State Park, near Manteca in San Joaquin County, along the Stanislaus River; along Paradise Cut, a channel of the San Joaquin River in the southern part of the Delta; and a recent reintroduction on private lands adjacent to the San Joaquin River NWR (Williams 1993, Williams and Basey 1986). A catastrophic flooding event in winter 1997 greatly reduced the numbers of riparian brush rabbit in Caswell Memorial State Park, spurring development of a captive breeding and reintroduction program. Habitat for the riparian brush rabbit consists of riparian forests with a dense understory shrub layer. Although suitable habitat is likely to be present in the Restoration Area, this species is not likely to occur there because of its limited distribution.

Potential threats to this species are habitat conversion to agriculture, wildfire, disease, predation, flooding, clearing of riparian vegetation, and the use of rodenticides. The species also is at risk from the lack of elevated mounds with protective cover to serve as flood refuges in remaining riparian habitat. A draft recovery plan has been prepared for upland and riparian species in the San Joaquin Valley, including the riparian brush rabbit (USFWS 1998a). The recovery plan includes three actions: establish an emergency plan and monitoring system to provide swift action to save individuals and habitat at Caswell

Memorial State Park in the event of flooding, wildfire, or a disease epidemic; develop and implement a cooperative program with landowners; and reevaluate the status of the rabbit within 3 years of recovery plan approval.

Fresno Kangaroo Rat

Fresno kangaroo rat (*Dipodomys nitratoides exilis*), which is Federally listed as endangered, occupies only alkali desert scrub vegetation at elevations of 200–300 feet (DFG 1992b). This species, the smallest of California's kangaroo rats, historically occurred in north-central Merced County, southwestern Madera County, and central Fresno County; however, it is believed to exist only in a small area in western Fresno County and is considered by some to be extirpated from along the San Joaquin River (McBain and Trush 2002). This species was captured at the Alkali Sink Ecological Reserve and Mendota Wildlife Management Area near the Restoration Area in 1981, 1985, and 1992, but extensive trapping since 1993 in Fresno and Madera counties have not documented additional kangaroo rats (McBain and Trush 2002). Critical habitat for this species has been established in and near the Mendota Wildlife Area, approximately 1.75 miles southeast of Reaches 2A and 2B (Figure 5-3). The primary threats affecting the Fresno kangaroo rat are habitat loss related to conversion to developed or agricultural land uses, and incompatible grazing practices, and potentially the illegal use of rodenticides (USFWS 1998a). Flooding of habitat by the San Joaquin River has also been considered a potential threat. A recovery strategy for Fresno kangaroo rat has been developed by USFWS and was included in the *Recovery Plan for Upland Species of the San Joaquin Valley, California* (USFWS 1998a). This strategy relies on additional preservation, restoration, and enhancement of habitat, and possibly reintroduction of Fresno kangaroo rats to restored but unoccupied habitat. Obtaining additional information on the distribution and abundance of Fresno kangaroo rats is also a component of the recovery strategy, as is developing management prescriptions for the species and continued monitoring of its abundance.

San Joaquin Valley (Riparian) Woodrat

San Joaquin Valley (or riparian) woodrat (*Neotoma fuscipes riparia*), which is Federally listed as endangered, was historically found along the San Joaquin, Stanislaus, and Tuolumne rivers and likely occurred throughout the riparian forests of the northern San Joaquin Valley (USFWS 1998a). Its range has become much more restricted because of extensive modification and destruction of riparian habitat along streams in its former range in the Central Valley. The only verified extant population is restricted to approximately 250 acres of riparian forest in Caswell Memorial State Park on the Stanislaus River, at the confluence with the San Joaquin River (USFWS 1998a). This species is most abundant in areas with deciduous valley oaks and some live oaks and with dense shrub cover. In riparian areas, the highest densities of woodrats and their houses are typically in willow thickets with an oak overstory. There are no documented CNDDB occurrences of San Joaquin Valley woodrat in or in the vicinity of the Restoration Area, although it could occur in suitable habitat.

Potential threats to this species include habitat conversion to agriculture, wildfire, disease, predation, flooding, drought, clearing of riparian vegetation, use of rodenticides, and browsing and trampling by ungulates (USFWS 1998a). A recovery strategy for San

Joaquin Valley woodrat has been developed by USFWS and was included in the *Recovery Plan for Upland Species of the San Joaquin Valley, California* (USFWS 1998a). This strategy relies on additional preservation, restoration, and enhancement of habitat and possibly reintroduction of this woodrat to restored but unoccupied habitat. Reducing habitat fragmentation and conserving corridors of riparian habitat are important components of this strategy. Collaboration with landowners and levee maintenance districts is also a component of the recovery strategy.

San Joaquin Kit Fox

San Joaquin kit fox (*Vulpes macrotis mutica*), which is Federally listed as endangered, is presumed to have historically ranged from Contra Costa and San Joaquin counties in the north to Kern County in the south, and along the coast in Monterey, Santa Clara, and Santa Barbara counties. In portions of this geographic range, the San Joaquin kit fox still occurs in seasonal wetland, alkali desert scrub, grassland, and valley-foothill hardwood vegetation. Its optimum habitat consists of a variety of open, level areas with loose-textured soil, scattered shrubby vegetation, and little human disturbance. The San Joaquin kit fox has been observed in and adjacent to the West Bear Creek Unit of the San Luis NWR Complex (McBain and Trush 2002). Numerous additional records exist for this species in and adjacent to the Restoration Area, including records of active dens. Although most of these records are more than 15 years old (CNDDB 2009), this species is likely to be present in suitable habitat in the Restoration Area.

Loss and degradation of habitat by agricultural, industrial, and urban development and associated practices continue, decreasing the carrying capacity of remaining habitat and threatening kit fox survival (USFWS 2007). Such losses contribute to kit fox declines through displacement, direct and indirect mortalities, introduction of barriers to movement, and reduction of prey populations. San Joaquin kit fox is also threatened by rodenticide use and by competitive displacement or predation by other species, such as the nonnative red fox (*Vulpes vulpes*), coyote (*Canis latrans*), domestic dog (*C. familiaris*), bobcat (*Felis rufus*), and large raptors. A recovery strategy for San Joaquin kit fox has been developed by USFWS and was included in the *Recovery Plan for Upland Species of the San Joaquin Valley, California* (USFWS 1998a). This strategy relies on enhanced preservation and management of three core populations, and an important component of this preservation and management is sustaining and increasing habitat connectivity. Gathering additional information on the distribution and movement of kit foxes is also a component of the recovery strategy, along with developing restoration and management prescriptions for the species.

6.0 Effects

As described in Section 1.3, "Action Area," implementing WY 2010 Interim Flows under the SJRRP may affect Federally listed species in the following areas:

- Millerton Lake and the San Joaquin River between Kerkhoff Dam and Millerton Lake.
- San Joaquin River from Friant Dam downstream to the Delta.
- Eastside Bypass downstream from the Sand Slough Control Structure, and the Mariposa Bypass.
- Merced, Tuolumne, and Stanislaus rivers downstream from New Exchequer, Don Pedro, and New Melones dams, respectively.
- South and central Delta, defined as the San Joaquin River and its tributaries within the Delta west to its confluence with the Sacramento River.

This chapter analyzes the direct effects that would result from WY 2010 Interim Flows after incorporation of conservation measures developed to minimize potential effects on listed species (see Section 3.5.2, "Conservation Measures for Listed Species"). The proposed project is not expected to have any indirect effects because the release of the WY 2010 flows is not expected to result in any measureable changes later in time to water levels, riparian vegetation, or other habitat conditions for listed species. Other activities that are interrelated or interdependent with the WY 2010 Interim Flows were considered for their potential to affect listed species.

In addition to evaluating the potential effects on species and their habitats, this chapter evaluates the effect of the WY 2010 Interim Flows on designated critical habitat and essential fish habitat. USFWS and NMFS define "adversely affect" as it applies to critical habitat as follows:

> *[A] direct or indirect alteration that appreciably diminishes the value of critical habitat for both the survival and recovery of a listed species. Such alterations include, but are not limited to, alterations adversely modifying any of those physical or biological features that were the basis for determining the habitat to be critical.*

6.1 Direct and Indirect Effects

Direct effects are defined as those effects which will have an immediate effect on the species or its habitat as a result of the proposed project activities. Indirect effects are those effects which are caused by, or result from the proposed project activities, are later in time, and are reasonably certain to occur. Direct and indirect effects for both aquatic and terrestrial species are described below.

6.1.1 Aquatic Species

Delta Smelt

The potential direct and indirect effects of implementing the WY 2010 Interim Flows on delta smelt are described below.

Delta Flow Patterns. Patterns of flow circulation in the Delta strongly affect fish distribution and migration behaviors. The largest flows in the Delta are tidal flows, which far exceed other flows in most Delta channels, but the nontidal flows determine the net direction of water movement and thereby affect fish movements.

Increased San Joaquin River flow may affect Delta outflow and X2. X2 is largely determined by Delta outflow and is often used to index the location of the LSZ (Kimmerer 2004). The LSZ is an area of historically high prey densities and other favorable habitat conditions for a number of Delta fish species, including delta smelt (Kimmerer 2004). However, the contribution of the San Joaquin River to Delta outflow is much smaller than that of the Sacramento River, so any effect of WY 2010 Interim Flows on Delta outflow or X2 would be negligible.

The south Delta is generally considered poor habitat for delta smelt relative to other parts of the Delta (Feyrer 2004, Monson et al. 2007, Nobriga et al. 2008) because of risk of entrainment, high water temperatures during summer and fall, and increased predation. Predation is increased because (1) water clarity is generally higher in the south Delta (Feyrer, Nobriga, and Sommer 2007, Nobriga et al.2008), making the prey fish more visible to their predators; (2) Clifton Court Forebay, the fish louver screens at the Jones and Banks facilities, and other facilities and structures in the south Delta concentrate and disorient prey fish and provide ambush sites for predacious fish; and (3) recent invasions by the submerged plant *Egeria densa* provide favorable habitat conditions for black bass species, which prey heavily on young life stages of most fish species (Nobriga et al. 2005). The increased risks of entrainment and predation and the high summer water temperatures reduce the fitness of delta smelt residing in the south Delta. Therefore, delta smelt benefit from flow patterns that lower their occurrence in the south Delta.

In years with relatively high Delta outflow, most delta smelt spawning occurs in Suisun Bay, but in years of low Delta outflow, they spawn farther upstream, including in the lower Sacramento and San Joaquin rivers. Therefore, except during years of high outflow, adult delta smelt are most likely to occur in the south Delta when they migrate upstream in December through April and before the larvae and juveniles have migrated downstream, which is usually largely complete by June. Delta smelt that spawn in the vicinity of the lower San Joaquin River are most at risk of being drawn into the south Delta by reverse flows. Larvae are slowly transported downstream as they develop. However, larvae and many juveniles remain in upstream portions of the Delta for a month or more, particularly in years with low Delta inflow. During such periods, they are at risk of being transported by reverse flows to the south Delta and the export pumps.

Changes in south and central Delta flow patterns resulting from implementing the WY 2010 Interim Flows are expected to reduce the incidence of delta smelt in the south Delta, where entrainment and predation risks are high and summer water temperatures are unsuitable for the species. Therefore, the flow patterns expected under the WY 2010 Interim Flows are anticipated to have a beneficial effect on delta smelt and its critical habitat. There would be no adverse effect on delta smelt resulting from Delta flow patterns.

Water Temperature and Dissolved Oxygen. The south Delta typically has poor water temperature conditions for delta smelt, especially during late summer and early fall (Nobriga et al. 2008, Feyrer 2004, Kimmerer 2004). Water temperatures would be not be affected in the south Delta by implementing the WY 2010 Interim Flows.

Implementing the WY 2010 Interim Flows would potentially improve DO conditions in the San Joaquin River near the Stockton DWSC. DO levels at the Stockton DWSC are often low during late summer and early fall because of high water temperatures and algal biomass and low river flow (Giovannini 2005, Lee and Jones-Lee 2003). San Joaquin River inflow to the Delta is expected to increase under the WY 2010 Interim Flows. It is assumed that operations of the Head of Old River Barrier, which is installed during fall of most years to increase San Joaquin River flow past Stockton, would not change. The increased flow would likely lead to higher DO levels at the Stockton DWSC, which would benefit fish residing in this area. However, delta smelt rarely occur in this area and therefore would not be affected.

Implementing the WY 2010 Interim Flows is expected to have no effect on water temperatures in the Delta but would likely help to alleviate the low DO conditions at the Stockton DWSC during late summer and fall. Delta smelt rarely occur in this part of the Delta, so the WY 2010 Interim Flows will not result in any effects beyond those covered in the USFWS 2008 OCAP BO.

Contaminants. Implementing the WY 2010 Interim Flows would increase San Joaquin River flow, which would dilute contaminants from agricultural drainage or other sources. This effect likely would not extend far into the Delta, because much of the increased water volume would be offset by exports at the Jones and Banks facilities. Few delta smelt occur in the portion of the Delta affected by the dilution effects; therefore, the WY 2010 Interim Flows are not likely to result in effects beyond those described in the USFWS 2008 OCAP BO.

Predation. The potential effects of implementing the WY 2010 Interim Flows on predation of delta smelt may be determined by the effect of the flows on the distribution of delta smelt in the south Delta. Increased flows in the San Joaquin River through the Delta are expected to reduce the incidence of delta smelt in the south Delta. Therefore, the WY 2010 Interim Flows are not likely to result in effects beyond those described in the USFWS 2008 OCAP BO.

Food Resources. Implementing the WY 2010 Interim Flows may have two potential effects on the availability of *Pseudodiaptomus,* the food resource for delta smelt, in the south Delta. Increased diversion at the Jones and Banks export facilities would likely entrain high numbers of copepods, including *Pseudodiaptomus*, and reduce their abundance. However, the increased San Joaquin River flows would more rapidly transport copepods produced in the south and central Delta downstream to delta smelt foraging areas in Suisun Bay and the lower Delta. The effects of increased entrainment of *Pseudodiaptomus* and more rapid downstream transport of the copepods would result in no net effect on delta smelt food resources. Therefore, the WY 2010 Interim Flows are not likely to result in effects beyond those described in the USFWS 2008 OCAP BO.

Central Valley Steelhead DPS

The geographic range and designated critical habitat of Central Valley steelhead overlap the Action Area in the south and central Delta.

San Joaquin River Flow Upstream from the Merced River Confluence.
Implementing the WY 2010 Interim Flows would increase flows in the section of the San Joaquin River from Friant Dam to the Delta. Segments of the San Joaquin River upstream from the Merced River are currently often dry. The WY 2010 Interim Flows would occur from October 1 through November 20, 2009, and begin again on February 1, 2010. Flows immediately upstream from the Merced River confluence increased by an average of 220 cfs in February to a maximum of an average of approximately 1,250 cfs in April.

Increased flows in the San Joaquin River downstream from the Merced River confluence would improve overall conditions for migrating adult and juvenile steelhead by improving water quality, and slightly higher water velocities. This would likely reduce or prevent migration delays by both adults and juveniles.

Increased flows upstream from the Merced River confluence may potentially trigger adult Central Valley steelhead migrating toward the Merced River to stray into the San Joaquin River upstream from the confluence. Such straying would potentially reduce the Merced River population. However, the WY 2010 Interim Flows would be provided primarily outside the November-through-January period of steelhead upstream migration. In addition, the Hills Ferry Barrier operations would continue in fall (during the WY 2010 Interim Flows) to prevent the unwanted upstream migration of Central Valley steelhead past the Merced River confluence during mid-September through early December, when the barrier is operational.

Central Valley steelhead juveniles, including smolts, emigrating from the Merced River could also stray into the San Joaquin River mainstem upstream from the confluence, although juveniles generally migrate with the flow, which reduces the risk of upstream straying. Because few juvenile Central Valley steelhead have ever been observed in the San Joaquin River upstream from the Merced River confluence, implementing the WY 2010 Interim Flows would not include deployment of the Hills Ferry Barrier during spring Interim Flows.

Because of measures adopted to prevent straying of Merced River adult steelhead into the San Joaquin River upstream from the confluence, implementing the WY 2010 Interim Flows is not likely to adversely affect straying of Central Valley steelhead.

Flow in the Lower San Joaquin River and Tributaries. Tributary releases to meet VAMP water quality objectives at Vernalis would be affected in one of two ways. In conditions where WY 2010 Interim Flows contribute toward meeting the same VAMP flow threshold that would have otherwise been in place, required releases from tributary reservoirs could be reduced. In conditions where WY 2010 Interim Flows cause a higher VAMP flow threshold than would have otherwise been in place, required releases from tributary reservoirs would be made to achieve the higher threshold. Changes in VAMP contribution releases from tributary reservoirs would not affect the ability to meet instream fish and water quality minimum flow requirements in the Merced, Tuolumne, or Stanislaus rivers.

Similarly, increased flows in the lower San Joaquin River resulting from implementing the WY 2010 Interim Flows would improve water quality conditions upstream from the Stanislaus River, thereby reducing required flow releases from New Melones Reservoir pursuant to D-1422 to achieve water quality objectives at Vernalis. These changes would not affect the ability to meet instream fish and water quality minimum flow requirements in the Stanislaus River.

Because minimum instream flow requirements and water quality standards would continue to be met, changes in San Joaquin River flow resulting from implementing the WY 2010 Interim Flows are not likely to adversely affect Central Valley steelhead or its designated critical habitat.

Delta Flow Patterns. Central Valley steelhead migrate through the Delta as adults moving upstream to spawn and as juveniles and smolts emigrating on their way to the ocean. Most Central Valley steelhead spawn in the Sacramento River and its tributaries, but the effects of implementing the WY 2010 Interim Flows on these fish would be less substantial than on those spawning in the San Joaquin River basin, so this analysis will focus on the San Joaquin River basin spawners. The spawning migrations bring the steelhead to the Delta in November through January, and the emigration of smolts occurs during spring, peaking in April and May.

The direct effects of implementing the WY 2010 Interim Flows in the Delta would include increased inflow from the San Joaquin River and increased exports at the Jones and Banks export facilities (see Section 3.3, “Proposed Action”). The export facilities are located in the southwestern Delta and are connected by Old and Middle rivers to the San Joaquin River close to where it enters the southeastern Delta. The facilities are also connected by the same two rivers to a more downstream reach of the San Joaquin River. Other channels between these locations connect the middle reach of the river to the export facilities. When the export pumps are not operating, flow in Old and Middle rivers moves from the upstream portions that join the San Joaquin River in the southeastern Delta to the downstream portions that join the lower portion of the river. However, when the pumps are operating, they often export such large volumes of water that flow in the downstream portions of Old and Middle rivers moves upstream toward the pumps.

The 2008 OCAP BO for delta smelt places restrictions on reverse flows in the downstream Old and Middle rivers, which helps to indirectly protect steelhead trout.

Increased flows often help trigger adult steelhead to begin moving upstream, so increased San Joaquin River inflow during late fall and winter would potentially help to initiate the spawning migrations. Increased inflow also potentially would provide stronger environmental cues that would help to keep the salmon from straying out of the river channel into the south Delta. However, when export pumping is increased to recirculate San Joaquin River inflow, increased flow toward the pumps in upper Old and Middle rivers would potentially cause increased straying of the migrating adults into the south Delta, where their progress would be potentially impeded by barriers and irregular flow patterns (Mesick 2001).

Reverse flows lower Old and Middle rivers, north of the south Delta export facilities, draw some Sacramento River water from upstream of the confluence of the Sacramento and San Joaquin rivers through the Delta Cross Channel and Georgiana Slough into the San Joaquin side of the Delta. After the Sacramento River water reaches the confluence, the reverse flows may draw more of this water upstream into the San Joaquin River and the south Delta. These flows likely cause straying and delays in the migrations of Sacramento River Central Valley steelhead (Brandes and McLain 2001). However, as a result of the 2008 OCAP BO for delta smelt, reverse flows in Old and Middle River will be regulated, restricting the potential effect of the WY 2010 Interim Flows on these flows. Therefore, implementing the WY 2010 Interim Flows is not likely to adversely affect Central Valley steelhead from the Sacramento during their upstream or downstream migrations through the Delta.

Migrations of adult San Joaquin River fall-run salmon are often delayed by low DO levels near the Stockton DWSC during the September-through-November migration period (Giovannini 2005). Low DO at this location is less likely to affect migrating adult steelhead because water temperatures are generally lower and flows are often higher during the period that the steelhead migrate.

Increased San Joaquin River inflow would likely benefit emigrating Central Valley steelhead. Tagging studies conducted for VAMP have demonstrated that fall-run Chinook smolt survival through the south and central Delta is positively correlated with San Joaquin River inflow (SJRGA 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009). Higher inflow likely reduces the transit time of the smolts through the Delta, thus reducing their time of exposure to predators, poor water quality, low food supply, and other mortality factors. High inflow also helps to prevent straying into the south Delta, where habitat conditions are especially poor and risks of entrainment greatly increase. Effects of increased San Joaquin River inflow on Central Valley steelhead emigrating from the San Joaquin River are expected to be similar.

Although increased San Joaquin River inflow would potentially improve conditions for emigrating steelhead, the increased flows in upper Old and Middle rivers resulting from the higher levels of pumping required to recirculate the San Joaquin River water would potentially increase rates of straying by the smolts, which would potentially negate any benefit derived from higher inflows. Straying of smolts into the south Delta would likely increase entrainment and predation risks and delay migrations. The positive and negative effects of the changes in Delta flow patterns are expected to offset each other and therefore are considered not likely to adversely affect the steelhead smolts.

Water Temperature and Dissolved Oxygen. Implementing the WY 2010 Interim Flows would result in increased flow in the lower San Joaquin River and the Delta. The .increased flow would help to buffer the river from changes in heating inputs and thereby moderate temperature changes.

Implementing the WY 2010 Interim Flows would potentially increase DO levels in the San Joaquin River near the Stockton DWSC. DO levels at the Stockton DWSC are often low during late summer and early fall because of high water temperatures and algal biomass and low river flow (Giovannini 2005, Lee and Jones-Lee 2003). San Joaquin River inflow is expected to increase under the WY 2010 Interim Flows. It is assumed that operations of the Head of Old River Barrier, which is installed during fall of most years to increase San Joaquin River flow past Stockton, would not change. The increased flow would likely lead to higher DO levels at the Stockton DWSC, which would benefit adult Central Valley steelhead migrating through this area. However, low DO at the Stockton DWSC is rarely a problem during November through January, when adult steelhead are migrating upstream, so there would be little effect of the change in summer-through-fall DO levels on steelhead.

Implementing the WY 2010 Interim Flows is expected to have no effect on water temperatures in the lower San Joaquin River or the Delta, but it would likely alleviate the low DO conditions at the Stockton DWSC during late summer and fall. There would be no effect on Central Valley steelhead or its designated critical habitat.

Contaminants. Implementing the WY 2010 Interim Flows would increase San Joaquin River flow, which would dilute contaminants from agricultural drainage or other sources. Therefore, it would likely have a beneficial effect on Central Valley steelhead and its designated critical habitat in the lower San Joaquin River. The effect would likely not extend far into the Delta, because much of the increased water volume would be offset by exports at the Jones and Banks facilities.

Predation. The potential effects of implementing the WY 2010 Interim Flows on predation of Central Valley steelhead smolts are expected to be largely determined by the effects of the flows on the straying of smolts into the south Delta. Predation rates are higher for most fishes in the south Delta than in other parts of the Delta for a variety of reasons: (1) turbidity is generally lower in the south Delta, so fish are more visible to their predators (Nobriga et al. 2008, Feyrer, Nobriga, and Sommer2007); (2) many of the structures and facilities in the south Delta concentrate or disorient prey fish and provide ambush sites for predacious fish, particularly Clifton Court Forebay and the fish louver screens at the Jones and Banks export facilities (Reclamation 2008); and (3) recent invasions by the submerged plant *Egeria densa* provide favorable habitat conditions for black bass species, which prey heavily on young fish life stages (Nobriga and Feyrer 2007, Nobriga et al. 2005). The effects of increased San Joaquin River flows and increased flows in Delta channels leading into the south Delta are expected to offset one another, resulting in no change in smolt straying into the south Delta. Therefore, implementing the WY 2010 Interim Flows is considered not likely to adversely affect predation on Central Valley steelhead smolts.

Sacramento River Winter-Run Chinook Salmon ESU and Central Valley Spring-Run Chinook Salmon ESU

The ranges of both Sacramento River winter-run and Central Valley spring-run Chinook salmon overlap very little with the Action Area. Both runs spawn in the Sacramento River or its tributaries, and both use the Sacramento River as a migration corridor through the Delta. However, both upstream migrating adults and outmigrating smolts do stray into the Action Area, particularly when the DCC gates are open and/or south Delta export rates are high relative to San Joaquin River inflow, which causes highly negative flows in the Old and Middle rivers north of the export facilities. Potential effects of implementing the WY 2010 Interim Flows on these runs are similar and are the same as those previously described for Central Valley steelhead from the Sacramento River, except that the timings of migrations are different.

Winter-run Chinook salmon migrate upstream through the Delta from approximately December through June, and the smolts emigrate through the Delta from January through May. Implementing the WY 2010 Interim Flows is expected to increase San Joaquin River inflow and increased flow in the river through the Delta. No changes of flows in the Old and Middle rivers in the central Delta or in operation of the DCC are anticipated. Therefore, fewer adults or smolts would be likely to stray from the Sacramento River into the San Joaquin River side of the Delta, reducing transit time and improving survival. The effect on straying is expected to be small; therefore, implementing the WY 2010 Interim Flows is considered not likely to adversely affect Sacramento River winter-run Chinook salmon or its designated critical habitat.

Spring-run Chinook salmon migrate upstream through the Delta from approximately March through June. Timing of smolt emigration is variable because smolt may emigrate as young-of-the-year or as yearlings (Reclamation 2008). As a result, most spring-run emigration occurs either during November and December or during March through May. As indicated for winter-run Chinook salmon, implementing the WY 2010 Interim Flows is expected to increase San Joaquin River inflow and increased flow in the river through the Delta, which would potentially reduce straying from the Sacramento River. The effect on straying is expected to be small; therefore, implementing the WY 2010 Interim Flows is considered not likely to adversely affect Central Valley spring-run Chinook salmon or its designated critical habitat.

Southern DPS of the North American Green Sturgeon

Adult green sturgeon migrate up the Sacramento River to spawn from April through June (Moyle 2002). It is unknown whether the species spawns in the San Joaquin River. Juveniles are entrained in the Jones and Banks export facilities, but numbers are low relative to those of most Delta species. It may be assumed that sturgeon are adversely affected by the same poor conditions in the south Delta that affect other species and that they would similarly benefit from conditions that reduced their exposure to this portion of the Delta. Adult and juvenile green sturgeon may be found in the Delta at any time of year.

Because they reside in the Delta throughout the year, green sturgeon would be potentially affected by changes in Delta flow patterns resulting from implementing the WY 2010 Interim Flows in any month. Whether San Joaquin River inflows and increased flows in the southeast Delta channels leading into the south Delta affect movement of adult or juvenile green sturgeon is unknown, but it is assumed that they do. As previously described for delta smelt and Central Valley steelhead, flow conditions expected under the WY 2010 Interim Flows would likely result in reduced movement to the south Delta or no change in such movement, and it is expected that this also would be true for green sturgeon. Therefore, implementing the WY 2010 Interim Flows is considered not likely to adversely affect Southern DPS of the North American green sturgeon or its designated critical habitat.

6.1.2 Effects of Proposed Action on EFH

Increased flows will directly benefit EFH for Pacific salmon in the Action Area in the same manner as described above for all ESUs of Chinook salmon. There would be no direct effect to starry flounder EFH.

6.1.3 Terrestrial Species

With implementation of WY 2010 Interim Flows, the annual reduction in water-surface elevation of Millerton Lake would occur earlier in the year. However, fluctuations in Millerton Lake and the San Joaquin River upstream to Kerkhoff Dam would remain within historical levels. WY 2010 Interim Flows would not result in inundating areas that are not regularly inundated or result in drying of areas that are not regularly subject to drying from reservoir draw down under current operation of Friant Dam. Between the Merced River and the Delta, the increase in San Joaquin River flow would be small relative to the seasonal and interannual variation in flow along this segment of the river. The additional water resulting from WY 2010 Interim Flows would become a progressively smaller portion of the San Joaquin River's total flow as additional water enters the river from major tributaries (i.e., the Merced, Tuolumne, and Stanislaus rivers).The increased flow would also be much smaller than flood flows that currently occur every 2 to 5 years along this segment of the San Joaquin River. WY 2010 Interim Flows would not be released during periods of flood flows. It is anticipated that WY 2010 Interim Flows would create additional flood storage space in Millerton Lake.

Effects of the Proposed Action on the hydrology of the Tuolumne, Stanislaus, and Merced rivers would be much less than on the hydrology of the lower San Joaquin River. With implementation of WY 2010 Interim Flows, more water from the San Joaquin River could flow downstream from the Merced River confluence; as a result, less water would need to be released from New Exchequer, Don Pedro, and New Melones dams into the Merced, Tuolumne, and Stanislaus rivers to meet minimum flow requirements and water quality standards in the San Joaquin River. However, any changes in flow originating from these rivers would be well within the historic fluctuation levels and would last for only a single year. The resulting alterations to environmental conditions would not be sufficient to adversely affect riparian habitats or otherwise affect listed species.

Implementing WY 2010 Interim Flows could increase water flow from the San Joaquin River into the Delta. However, these additional inflows would not significantly change water surface elevations, water quality, or other ecologically important conditions in the Delta for terrestrial species. The additional flow into the Delta as a result of WY 2010 Interim Flows would be insufficient to alter habitat conditions and vegetation or to otherwise affect listed terrestrial species in the Delta, which currently is subject to varying water levels.

Vernal Pool Plant Species

Six vernal pool plant species are known or have potential to occur in the Action Area: succulent owl's clover, hairy orcutt grass, San Joaquin Valley orcutt grass, Hoover's spurge, Colusa grass, and Greene's tuctoria.

Suitable habitat for succulent owl's clover and San Joaquin Valley orcutt grass is located in northern hardpan and northern claypan vernal pools found on alluvial terraces adjacent to Reach 1A of the San Joaquin River, and in northern basalt flow vernal pools on tabletops above the river and Millerton Lake between Kerkhoff Dam and Friant Dam. Northern hardpan and northern claypan vernal pool habitats on alluvial terraces adjacent to Reach 1A are also potentially suitable for hairy orcutt grass; however, this species does not occur in basalt flow vernal pools and has a lower elevation range limit than succulent owl's clover and San Joaquin Valley orcutt grass. Suitable vernal pool habitats for these three species are located outside of the portion of river channel that would be inundated by WY 2010 Interim Flows and outside of the fluctuation zone of Millerton Lake.

Hoover's spurge and Colusa grass are known to occur in the vicinity of the Restoration Area in the Merced NWR, and potentially suitable habitat for these species exists in northern hardpan and northern claypan vernal pools on alluvial terraces in and adjacent to Reach 4B2 and the Eastside and Mariposa bypasses. Although, potentially suitable vernal pool habitat for Hoover's spurge is presumably present, the likelihood that Hoover's spurge is present in the Action Area is low because the Merced NWR occurrence is the only one out of 29 occurrences documented in the CNDDB that is located in the San Joaquin Valley Vernal Pool Region (USFWS 2005). This single occurrence is located approximately 1.5 miles east of the Eastside Bypass, but not within the action area. This species is associated primarily with vernal pools of the Northeastern Sacramento Valley Vernal Pool Region in Butte and Tehama counties and the Southern Sierra Foothills Vernal Pool Region in Tulare County. The majority of known occurrences (58 percent) are found in the Northeastern Sacramento Valley Vernal Pool Region; the remaining occurrences are in the Southern Sierra Foothills and Solano-Colusa vernal pool regions (USFWS 2005). Colusa grass could be present in any suitable vernal pool habitat in or adjacent to the Eastside Bypass, though it has not been documented there, but suitable habitat for Colusa grass and Hoover's spurge is not expected to occur within the low-flow channels where Interim Flows would be conveyed.

Historic occurrences of Greene's tuctoria have been documented in the vicinity of the Tuolumne River in Stanislaus County. However, these occurrences are believed to be extirpated from the county (USFWS 2005). No extant occurrences of Greene's tuctoria are known within the Action Area, and Interim Flows are not expected to result in substantial changes in the timing or duration of flooding along the Tuolumne River. Any changes in hydrology within the tributary rivers of the San Joaquin River would be within the normal range of fluctuation for these rivers. No known occurrences of Greene's tuctoria exist in the vicinity of the San Joaquin River. Therefore, Interim Flows would not result in adverse effects on Greene's tuctoria.

All of the vernal pool plant species discussed here are adapted to ephemeral wetland habitats (i.e., habitats that become inundated during winter rains, then dry out completely by summer) and require the specific type of hydrologic regime found in vernal pools to successfully complete their life cycles. Vernal pool hydrology is characterized by unique patterns of filling and drying that do not occur in riverine wetlands or wetlands that are permanently inundated or saturated. Vernal pools are filled primarily through direct precipitation during winter and dry as a result of evaporation during spring and early summer. These hydrologic requirements do not occur in low-flow river channels that are typically flooded longer than vernal pools and convey high-velocity flows for a portion of the season. Therefore, suitable habitat for vernal pool plant species is not expected to be present in the low-flow channels that would convey WY 2010 Interim Flows.

The San Joaquin River downstream from Friant Dam is currently and historically has been managed to convey flows much later into spring and summer than ephemeral wetland habitats that support vernal pool plant species. Because plants endemic to vernal pools are not adapted to riverine habitats that are periodically flooded in summer and convey high-velocity flows, vernal pool plant species are not expected to be present within the low-flow channel. Releases of Interim Flows would be restricted to existing low-flow channels in the San Joaquin River and the bypasses and would avoid inundating vernal pools. Seepage and vegetation monitoring surveys would be conducted during releases of Interim Flows to determine whether Interim Flows need to be reduced to avoid affecting vernal pool habitats, as described in Section 3.5.2. Therefore, WY 2010 Interim Flows would not directly or indirectly affect aquatic habitat for vernal pool plant species and would not affect vernal pool plants.

Succulent owl's clover is believed to be self-pollinating, and Colusa grass, Greene's tuctoria, and the orcutt grasses are wind pollinated. Therefore, pollinators of these species would not be affected. Hoover's spurge is believed to be pollinated by various insects. Butterflies and moths, flies, beetles, bees, and wasps have all been observed visiting Hoover's spurge (USFWS 2005). WY 2010 Interim Flows is unlikely to flood substantial amounts of vegetation that could support insect pollinators of Hoover's spurge because flows would be restricted to the low-flow channel, which is typically kept clear of such vegetation by the presence of water, regular maintenance of the channel for conveyance, and periodic floods; therefore, the proposed action is not likely adversely affect insect pollinators.

Critical Habitat for Vernal Pool Plan Species. All critical habitat designated for San Joaquin Valley orcutt grass is outside the Restoration Area. Critical habitat for succulent owl's clover, hairy orcutt grass, and San Joaquin Valley orcutt grass has been designated in the Restoration Area on alluvial terraces adjacent to Reach 1A of the San Joaquin River. The critical habitat for these three species in this area overlaps considerably, but is not identical for each species. A small portion of critical habitat for succulent owl's clover (42 acres in Unit 4) and hairy orcutt grass (3 acres in Unit 6) extends along the north bank of the San Joaquin River in Reach 1A. The amount of critical habitat that could be affected by WY 2010 Interim Flows was estimated by calculating the amount of critical habitat within the river channel at the approximate ordinary high water mark. In addition, the Action Area includes designated critical habitat for succulent owl's clover in the Merced River and for hairy orcutt grass in the Tuolumne River. This is a very small fraction of the critical habitat designated for these species (Table 6-1).

The PCEs for these species, as well as the other vernal pool plants and invertebrates evaluated in this BA, generally include: (1) topographic features characterized by mounds, swales, or depressions within a matrix of surrounding uplands and (2) depressional features including isolated vernal pools with underlying restrictive soil layers that become inundated during winter rains and that continuously hold water or whose soils are saturated for a temporary period. The action area is unlikely to contain these PCEs because vernal pools, swales, or other seasonal wetlands within an upland matrix are not found within the low-flow channel of riverine habitats or the bypasses.

Because the WY 2010 Interim Flows would be restricted to the low-flow channel and the PCEs of critical habitat for vernal pool plant species are not likely to be present in the low-flow channel, the proposed action would not likely have an adverse direct or indirect effect on critical habitat for succulent owl's clover or for hairy orcutt grass.

**Table 6-1.
Critical Habitat for Vernal Pool Plants in the
Action Area**

Species	Unit Number	Total Acres in Unit	Location	Maximum Acres Designated Within Action Area[1]	Maximum Percent Within Action Area
Succulent owl's clover	4C	38,038	San Joaquin River Reach 1A	41	0.1
	3B	71,947	Merced River	7	0.01
Hairy orcutt grass	6	27,033	San Joaquin River Reach 1A	3	0.0
	4A	47,399	Tuolumne River	6	0.01
Hoover's spurge	6A	1,617	San Joaquin River Reach 4B2 and Eastside Bypass	35	2.2
	6B	6,030	San Joaquin River Reach 4B2 and Eastside and Mariposa Bypasses	501	8.3
	6C	6,911	Eastside Bypass	9	0.1
	4	37,595	Tuolumne River	14	0.04
	5A	33,381	Tuolumne River	6	0.02
Colusa grass	7D	6,911	Eastside Bypass	9	0.1
	6	54,119	Merced River	7	0.01
	4D	43,315	Tuolumne River	16	0.03
	5B	33,891	Tuolumne River	6	0.02
Greene's tuctoria	6D	44,517	Tuolumne River	14	0.03
	7	86,636	Merced River	7	0.01

Notes:
[1] Based on the published ordinary high water mark of the San Joaquin, Tuolumne, Merced, and Stanislaus rivers and aerial photo interpretation of levee boundaries of Eastside and Mariposa Bypasses. Because WY 2010 Interim Flows would not inundate this entire area (e.g., OHWM of San Joaquin River or bank-full levees in the bypasses), these calculations over-estimate the potential acreage of critical habitat that could be affected. Furthermore, the low-flow channels of the rivers and bypasses are unlikely to contain the PCEs of the designated critical habitats for the listed vernal pool species.

Critical habitat for Hoover's spurge has been designated in and adjacent to the Eastside and Mariposa bypasses and Reach 4B2 of the San Joaquin River (Table 6-1). Approximately 2.2 percent of Unit 6A (1,617 acres total), 8.3 percent of Unit 6B (6,030 acres total), and 0.1 percent of Unit 6C (6,911 acres total) is within the levees of the Eastside Bypass and therefore could be directly affected by WY 2010 Interim Flows; however, the WY 2010 Interim Flows would be confined to the low-flow channel and would not inundate the full width of the levees, so this approximation of acreage potentially affected is an over-estimation. In addition, WY 2010 Interim flows are unlikely to affect the PCEs of the critical habitat designations because vernal pool habitats are not found within the low-flow channel of the bypasses.

Critical habitat for Colusa grass has been designated in and adjacent to the east bank of the Eastside Bypass. The estimated amount of designated critical habitat for Colusa grass within the action area is approximately 9 acres in Unit 7D out of a total 6,902 acres present in the area, or 0.1 percent (Table 6-1).

In addition, within the Action Area, designated critical habitat is present for Hoover's spurge on the Tuolumne River, and for Colusa grass on the Merced and Tuolumne rivers (Table 6-1).

Although the critical habitat designated for these two species extends into the Restoration Area, suitable vernal pool habitat or the PCEs of the designation are not expected to be present within the low-flow channels to which Interim Flows would be restricted. Critical habitat for Colusa grass is designated well outside the low-flow channel of the Eastside Bypass and would not be affected by WY 2010 Interim Flows.

Critical habitat for Greene's tuctoria has been designated within the Action Area along the Merced and Tuolumne rivers. However, suitable vernal pool habitat for Greene's tuctoria is not expected to occur within the low-flow channels of these rivers, and changes in flow regime resulting from Interim Flows are not expected outside of the low-flow channels. The low-flow channel is unlikely to contain the PCEs of the critical habitat designation. At maximum flow velocity, which occurs during spring, modeling shows that Interim Flows would remain within the low-flow channels of the San Joaquin River and bypasses. Changes in flow velocity would be much less in tributaries than in the San Joaquin River and bypasses; therefore WY 2010 Interim Flows would not cause substantial changes in flow regime in these tributaries even during spring flows. Also, WY 2010 Interim Flows would not increase flood flow levels because they would not be released during periods of flood flows.

The Proposed Action could increase flood duration within the low-flow channels of the San Joaquin River and the Eastside and Mariposa bypasses during WY 2010 only. A single year of flooding of longer duration than is currently typical would not appreciably diminish the value of habitat for the survival and recovery of any listed vernal pool plant species. Therefore, this direct effect would be discountable. The WY 2010 Interim Flows would not affect the PCEs of critical habitat for succulent owl's clover, hairy orcutt grass, San Joaquin Valley orcutt grass, Hoover's spurge, Colusa grass, or Greene's tuctoria because it is not likely to adversely affect vernal pools, associated watersheds and hydrologic features, or adjacent upland habitat.

Recovery Plan for Vernal Pool Plant Species. Succulent owl's clover, hairy orcutt grass, San Joaquin Valley orcutt grass, Hoover's spurge, Colusa grass, and Greene's tuctoria are all addressed in the *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon* (Vernal Pool Recovery Plan) (USFWS 2005). Nearly the entire

Restoration Area, with the exception of Reach 1B, is encompassed within the vernal pool recovery units identified in the Vernal Pool Recovery Plan. The Proposed Action would not interfere with the recovery plan's goals, objectives, strategies, or criteria. Implementing the Proposed Action would not substantially reduce the viability of target species, reduce habitat value or interfere with the management of conserved lands or recovery units, or eliminate opportunities for conservation or recovery actions. Further, it would support the future enhancement and restoration of biological resources along the San Joaquin River. Therefore, implementing the Proposed Action is not likely to adversely affect recovery plans for vernal pool plant species.

Palmate-Bracted Bird's Beak

Palmate-bracted bird's beak has been documented in the vicinity of the Restoration Area near Reach 3 between the San Joaquin River and the Chowchilla Bypass, and also 4 miles south of Reach 2A. Suitable grassland habitat in alkaline soils is present in the Restoration Area and could be affected by Interim Flows. However, Interim Flows would be confined within the existing low-flow channels in areas that are currently subject to periodic flooding. This species is unlikely to be present on alluvial soils in areas that are seasonally inundated or periodically inundated by flood flows along the San Joaquin River. However, potentially suitable habitat may be present along the Eastside Bypass. The Proposed Action includes measures to avoid inundation of potential habitat for palmate-bracted bird's-beak along the Eastside Bypass as described in Section 3.5.2. Therefore, palmate-bracted bird's-beak would not be adversely affected by WY 2010 Interim Flows.

Palmate-bracted bird's beak is pollinated by insects. A survey conducted at the Springtown Alkali Sink in 1993 showed bumblebees to the primary pollinator for this species (USFWS 1998a). No other pollination data are available. With the releasing Interim Flows, water could be conveyed through the summer and fall of WY 2010. This flow duration,would be longer than currently typical in portions of the Restoration Area; however, it is is unlikely to result in a measurable direct effect on vegetation that could support insect pollinators of palmate-bracted bird's beakbecause flows would be restricted to the low-flow channel, which is typically kept clear of such vegetation by the presence of water, regular maintenance of the channel for conveyance, and periodic floods. Therefore, the proposed action is not likely adversely affect insect pollinators.

Critical Habitat for Palmate-Bracted Bird's Beak. No critical habitat has been designated for palmate-bracted bird's beak; therefore, implementing the Proposed Action would not adversely affect critical habitat for this species.

Recovery Plan for Palmate-Bracted Bird's Beak. Palmate-bracted bird's beak is addressed in the *Draft Recovery Plan for Upland Species of the San Joaquin Valley, California* (USFWS 1998a). Implementing the Proposed Action would not interfere with the recovery strategy for this species, which is to maintain self-sustaining populations in protected areas over the species' former range and reintroduce the species in areas where it has been extirpated. No recovery lands have been identified for this species in the Action Area; therefore, implementing the Proposed Action would not adversely affect recovery plans for palmate-bracted bird's beak.

Vernal Pool Invertebrates

Four Federally listed vernal pool invertebrates have potential to be affected by the Proposed Action: Conservancy fairy shrimp, longhorn fairy shrimp, vernal pool fairy shrimp, and vernal pool tadpole shrimp. These species are associated with vernal pool and seasonal wetland habitats and are not expected to occur in riverine habitats. Therefore, they are not expected to occur in habitats between the banks or levees of the San Joaquin, Merced, Tuolumne, or Stanislaus rivers. Within the Action Area, they could occur in the Eastside and Mariposa bypasses.

These bypasses were created in uplands that historically contained northern claypan vernal pools. Natural vernal pools have been eliminated from many areas as a result of land conversion for agricultural development, along with the hydrologic modification that resulted when the bypasses and agricultural diversions and discharges were created. However, because of the high clay content of the area’s soils, depressions caused by previous construction activities in upland habitats still tend to hold rainwater for an extended period, so soil and hydrologic conditions may be suitable to support vernal pool invertebrates in some areas.

Mapping conducted by Holland shows vernal pool habitats immediately adjacent to, but not including the Eastside and Mariposa bypasses (Figure 6-1). This data layer is based on aerial images acquired during 1976 to 1995 by DWR’s Land and Water Use Mapping Program. These color images were obtained by aircraft flying at approximately 5,000 feet above the ground surface. Images were reviewed at a scale of 1:10,400, and areas with vernal pools were mapped with a minimum map unit of 40 acres and a minimum of 2 vernal pools. Map units are based on vernal pool density and visible disturbance or fragmentation.

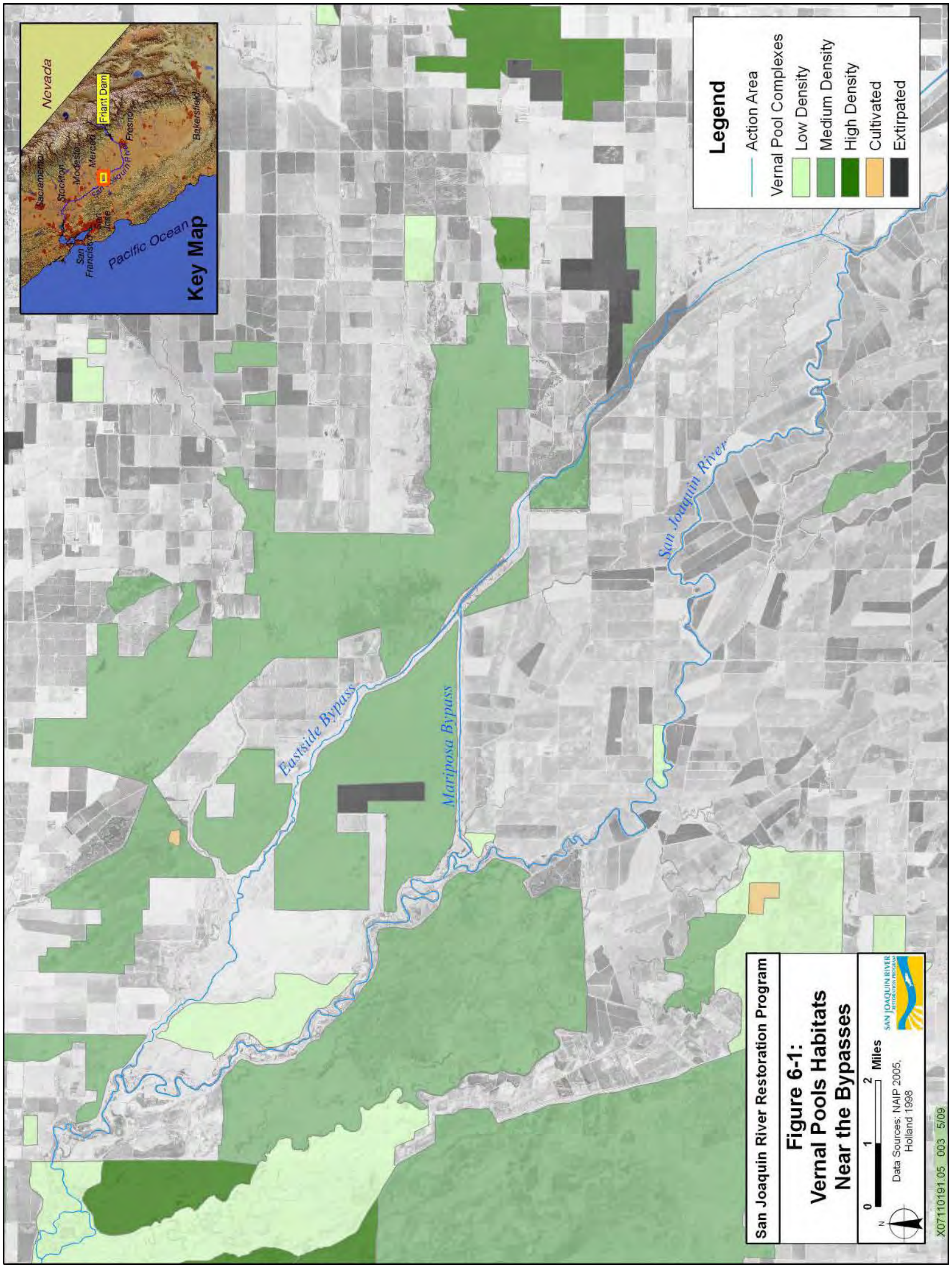
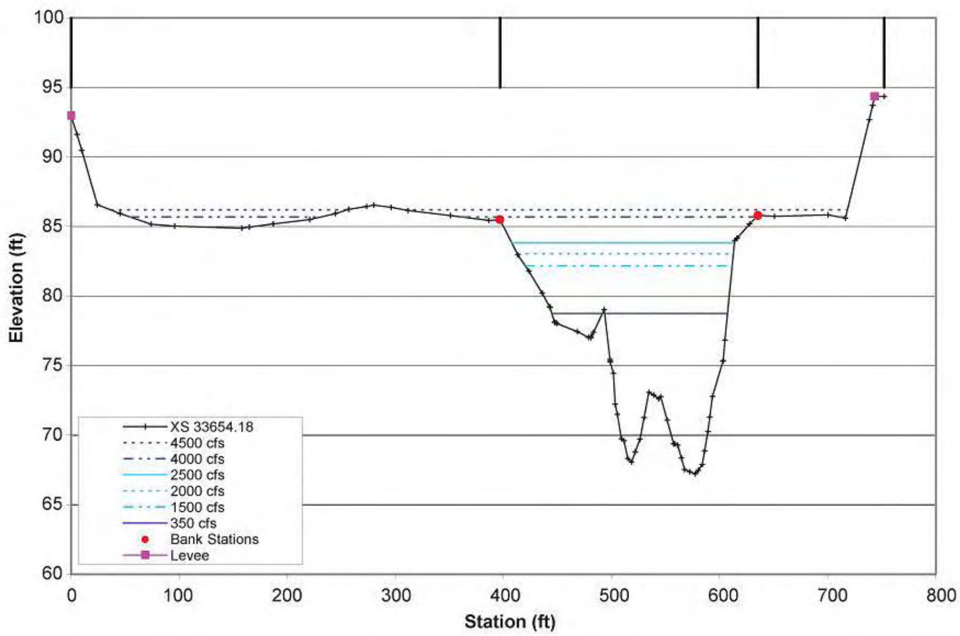


Figure 6-1.
Vernal Pools Habitats near the Bypasses

Baseline conditions within the existing low-flow channel bypasses are unlikely to be suitable for listed vernal pool invertebrates because the channels are regularly inundated during seasonal flood flows. A reconnaissance-level survey of the Eastside Bypass from West Washington Road to Sandy Mush Road was conducted in February and March 2000 (DFG 2000). In February, no evidence of any characteristic vernal pool species was observed in rainwater-filled depressions in the Eastside Bypass, with the exception of early successional invertebrates such as ostracods (seed shrimp) and ceriodaphnid cladocerans (water fleas). Dytiscid larvae and adults (predaceous diving beetles) and exoskeletons of crayfish (*Procambarus* sp.) were also commonly encountered. No vernal pool plant species surrounded the pools; cocklebur was the dominant plant species in these areas. In March, most of the pools observed during the previous survey were completely submerged under a continuous sheet of flowing water, likely the result of flood releases down the San Joaquin River. Large fish such as carp were observed in some of the deeper wetted areas, as well as some adult western toad (*Bufo boreas*). The few isolated pools that remained contained only a few invertebrates, such as Dytiscid larvae. The cladocerans and ostracods that dominated the pools during previous survey were no longer evident.

The WY 2010 Interim Flows would be expected to be confined to the existing low-flow channel in the bypasses and would avoid inundating any seasonal wetland habitat that may be present within the levees. Analysis of inundated surface areas for specific flows from 350 cfs to 8,000 cfs has indicated that maximum Interim Flows of 1,300 cfs in the Eastside Bypass would stay within the existing low-flow channel (Figure 6-2) and would not inundate higher areas within the floodplain (Figure 6-3) (DWR in preparation). As described in Section 3.5.2, “Conservation Measures,” the Proposed Action includes a measure that requires Reclamation to verify that flows would not inundate vernal pool or seasonal wetland habitat to ensure that these habitats would not be affected by the release of WY 2010 Interim Flows.

Based on the low likelihood that suitable habitat for vernal pool invertebrates would be present within the bypass levees, the confinement of WY 2010 Interim Flows to the low-flow channel, and monitoring during releases, the Proposed Action would not result in a measurable adverse effect on Conservancy fairy shrimp, longhorn fairy shrimp, vernal pool fairy shrimp, and vernal pool tadpole shrimp.

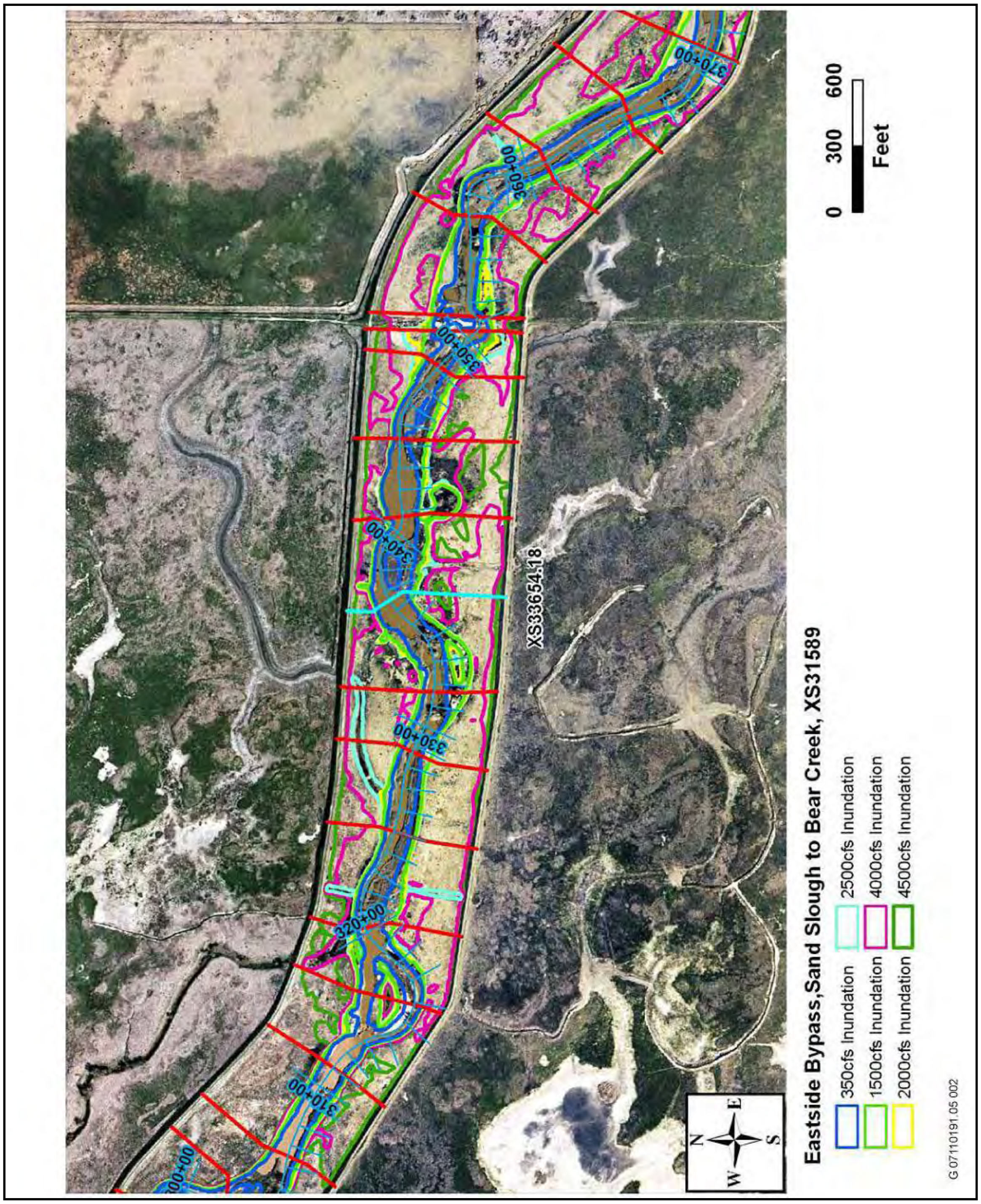


Profile	Equivalent	Elevation
4500	4500	86.21
4000	4000	85.7
2500	2500	83.81
2000	2000	83.04
1500	1500	82.17
350	350	78.76

G 07110191.05 001

Source: DWR in preparation

Figure 6-2.
Typical Cross-Section of Eastside Bypass from Sand Slough to Bear River



Source: DWR in preparation

Figure 6-3.
Water Surface Elevations in Eastside Bypass from Sand Slough to Bear River

Critical Habitat for Vernal Pool Invertebrates. Critical habitat for vernal pool tadpole shrimp, vernal pool fairy shrimp, Conservancy fairy shrimp, and longhorn fairy shrimp has been designated in and adjacent to the Eastside and Mariposa bypasses and San Joaquin River Reaches 4B2 and 5. The critical habitat for vernal pool tadpole shrimp, vernal pool fairy shrimp, and Conservancy fairy shrimp in this area are nearly identical, but critical habitat for longhorn fairy shrimp only is designated south of the San Joaquin River in Reaches 4B2 and 5. Using the published ordinary high water mark of the San Joaquin River and levee boundaries of the bypasses, the maximum amount of critical habitat that could be affected by WY 2010 Interim Flows was calculated (Figure 6-2). However, because the WY 2010 Interim Flows would be confined to the low-flow channel and would not inundate the full width of the levees, this approximation is an over-estimation of the amount of critical habitat that within the action area.

In addition in the Action Area, the designation of critical habitat for Conservancy fairy shrimp includes portions of the Merced River and the designation of critical habitat for vernal pool fairy shrimp includes portions of the Merced and Tuolumne rivers. Although the critical habitat designated for these species extends into the Action Area, suitable vernal pool habitat is not expected to be present within the low-flow channels or active river channels to which WY 2010 Interim Flows would be restricted. The low-flow channel and river channel is also not likely to contain the PCEs of the designated critical habitat for these species, as described above for vernal pool plants.

Table 6-2.
Critical Habitat for Vernal Pool Invertebrates in the Restoration Area

Species	Unit Number	Total Acres in Unit	Location	Maximum Acres Designated Within Action Area[1]	Maximum Percent Within Action Area
Conservancy Fairy Shrimp	7A	3,165	San Joaquin River Reach 4B2 and 5	5	0.1
	7B	1,617	San Joaquin River Reach 4b2 and Eastside Bypass	33	2.1
	7C	6,030	San Joaquin River Reach 4B2 and Eastside and Mariposa Bypasses	501	8.3
	7D	6,911	Eastside Bypass	9	0.1
	6	86,078	Merced River	7	0.01
Longhorn Fairy Shrimp	2	3,165	San Joaquin River Reach 4B2 and 5	5	0.1
Vernal Pool Fairy Shrimp	23A	3,165	San Joaquin River Reach 4B2 and 5	5	0.1
	23B	1,617	San Joaquin River Reach 4b2 and Eastside Bypass	33	2.2
	23C	6,030	San Joaquin River Reach 4B2 and Eastside and Mariposa Bypasses	501	8.3
	23D	6,911	Eastside Bypass	9	0.1
	22	69,139	Merced River	7	0.01
	21B	47,399	Tuolumne River	6	0.01
Vernal Pool Tadpole Shrimp	16A	3,165	San Joaquin River Reach 4B2 and 5	5	0.1
	16B	1,617	San Joaquin River Reach 4b2 and Eastside Bypass	35	2.2
	16C	6,030	San Joaquin River Reach 4B2 and Eastside and Mariposa Bypasses	501	8.3
	16D	6,911	Eastside Bypass	9	0.1

Notes:

[1]Based on the published ordinary high water mark of the San Joaquin, Merced, Tuolumne, and Stanislausrivers and aerial photo interpretation of levee boundaries of Eastside and Mariposa Bypasses. Because WY 2010 Interim Flows would not inundate this entire area (e.g., OHWM of San Joaquin River or bank-full levees in the bypasses), these calculations over-estimate the potential acreage of critical habitat that could be affected. . Furthermore, the low-flow channels of the rivers and bypasses are unlikely to contain the PCEs of the designated critical habitats for the listed vernal pool species.

Recovery Plan for Vernal Pool Invertebrates. Conservancy fairy shrimp, longhorn fairy shrimp, vernal pool fairy shrimp, and vernal pool tadpole shrimp are all addressed in the Vernal Pool Recovery Plan (USFWS 2005). Nearly the entire Restoration Area, with the exception of Reach 1B, is encompassed within the vernal pool recovery units identified in the Vernal Pool Recovery Plan. The Proposed Action would not interfere with the Recovery Plan's goals, objectives, strategies, or criteria. Implementing the Proposed Action would not substantially reduce the viability of target species, reduce habitat value or interfere with the management of conserved lands or recovery units, or eliminate opportunities for conservation or recovery actions. Further, it would support the future enhancement and restoration of biological resources along the San Joaquin River. Therefore, implementing the Proposed Action is not likely to adversely affect recovery plans for vernal pool invertebrates.

Valley Elderberry Longhorn Beetle

Blue elderberry shrubs, the host plant for valley elderberry longhorn beetle larvae, are abundant in Reaches 1 and 2 of the San Joaquin River and are sparsely distributed in or absent from Reaches 3, 4, and 5, based on kayak, ground, and aerial surveys conducted in 2004 and 2005 (ESRP 2006). Approximately 410 elderberry shrubs were mapped in Reaches 1 and 2. In Reaches 3, 4, and 5, three elderberry shrubs were observed from the air but could not be located during kayak or ground surveys. Exit holes made by valley elderberry longhorn beetle larvae as they leave the host plant during metamorphosis to the adult stage were found in few shrubs throughout the Restoration Area; less than 1 percent of stems observed had exit holes (ESRP 2006). Elderberry shrubs provide potentially suitable habitat throughout the Restoration Area. Elderberry shrubs grow rapidly, and they may exist in additional areas that have not been surveyed or may have grown in areas since the surveys were conducted. In addition, the beetles could occur in more shrubs; the exit-hole surveys were not comprehensive and results may be outdated.

Because of their locations higher on the streambanks, most elderberry shrubs in the Restoration Area are not expected to be inundated by WY 2010 Interim Flows; however, in San Joaquin River Reach 2A, some elderberry shrubs were noted to be growing along the channel (ESRP 2004, 2006), likely because of altered channel formation and limited flows. Except during times of floods, water passing Gravelly Ford (head of Reach 2A) typically infiltrates the sandy bed before it can reach the Chowchilla Bypass Bifurcation Structure (end of Reach 2A). The few elderberry shrubs in Reach 2 that are growing along the river channel may be partially inundated during a period in spring (up to a maximum of 1,370 to 1,470 cfs). The period of these higher maximum flows would be from mid-March through June, which corresponds to the natural hydrograph of rivers that receive snowmelt from the Sierra Nevada. Elderberry shrubs in Reach 2 are currently subject to temporary flood flows that occur every 2–5 years under existing conditions. Elderberry is a riparian species that can withstand periodic inundation; the WY 2010 Interim Flows would not be likely to result in loss of elderberry shrubs.

It is uncertain how valley elderberry longhorn beetles would respond to inundation of elderberry host plants for a period of up to 14 weeks from mid-March to the end of June (Talley, pers. comm., 2009). Valley elderberry longhorn beetle larvae use the pith of elderberry stems, an environment very low in nutrients (and probably low in oxygen), as a growth chamber until mid-March to June, when adults emerge to feed and reproduce on leaves and flowers of the elderberry shrub. Inundating the lower portions of the elderberry plant, if the plant is not damaged or killed, would not be likely to adversely affect beetle larvae if they were present (Talley, pers. comm., 2009).

In a study on the Cosumnes River, the density of valley elderberry longhorn beetle exit holes was negatively correlated with higher relative bank position (Fremier and Talley 2009). That is, the beetles are more likely to occur in shrubs closer to the river. Although many environmental variables may affect the distribution of valley elderberry longhorn beetle (Fremier and Talley 2009), the proximity to river flows and association with riparian communities are important factors that contribute to the species' presence (Talley, pers. comm., 2009).

The WY 2010 Interim Flows are not likely to result in a measurable direct effect on valley elderberry longhorn beetle because (1) most habitat for the species is outside the area that would be inundated by the flows; (2) the flows would not be of sufficient magnitude to result in scouring or deposition of sediment that could damage elderberry shrubs potentially containing valley elderberry longhorn beetle larvae or pupae; and (3) any larvae or pupae that are present in shrubs that could be temporarily inundated would likely be able to withstand conditions because they are adapted to riparian habitats that are subject to periodic inundation.

Critical Habitat for Valley Elderberry Longhorn Beetle. Critical habitat for valley elderberry longhorn beetle does not occur within the Action Area; therefore, none would be adversely modified as a result of the Proposed Action.

Recovery Plan for Valley Elderberry Longhorn Beetle. USFWS recently completed a 5-year status review for valley elderberry longhorn beetle and recommended delisting the species because of comprehensive riparian habitat restoration projects throughout the range of the species and because surveys have documented that the species is more widespread than thought at the time of listing (USFWS 2006d). At the time of listing, the primary threats to the species were identified as 1) loss of riparian habitat due to flood control, agricultural practices, and park management, and 2) inadequate regulatory mechanisms to protect the species. Surveys have documented valley elderberry longhorn beetle at over 190 locations throughout its range from Shasta County to Fresno County. Los of riparian habitat has slowed in the Central Valley and a number of programs are in place to help protect and restore it (e.g., HCPs, habitat restoration projects on federal, state, and private lands. Efforts specific to valley elderberry longhorn beetle have resulted in the protection of over 50,000 acres of riparian habitat and the restoration of approximately 5,100 acres of beetle habitat (USFWS 2006d).

California Tiger Salamander

California tiger salamander is not expected to be present within riparian areas or stream corridors because this species typically uses vernal pools and seasonal wetlands for breeding and upland grassland habitats for dispersal, foraging, and refuge. The primary historic breeding sites used by California tiger salamanders were vernal pools and other natural seasonal ponds (69 FR 47212). Vernal pools are an important part of the California tiger salamander's breeding habitat in the Central Valley and South San Joaquin regions, but they also use stock ponds in some areas, largely because vernal pool habitat in those areas has been destroyed (69 FR 47212). Riverine habitat is generally unsuitable for California tiger salamanders; therefore, they are not expected to be present in the San Joaquin, Merced, Stanislaus, or Tuolumne rivers and would not be affected by the Proposed Action in these areas.

Portions of the Eastside and Mariposa bypasses in the Action Area were created in uplands that contain vernal pool habitats. California tiger salamanders are known to occur north of the Eastside Bypass in the Merced NWR in floodplain wetlands, slough channels, vernal pools, and artificially created pools adjacent to levees and roads (CNDDB 2009).

As described above for vernal pool plants and invertebrates, the presence of vernal pools or seasonal wetland habitat within the Eastside and Mariposa bypasses has not been confirmed, but these habitats are unlikely to exist within the low-flow channel. The releases of WY 2010 Interim Flows would be restricted to the low-flow channel and would avoid inundating vernal pools and other floodplain habitat that could contain seasonal wetlands. Seepage and vegetation monitoring surveys would be conducted during releases of Interim Flows to determine whether Interim Flows need to be reduced to avoid impacts on these species' habitats. Therefore, flows would not have a measureable direct effect on aquatic habitat for California tiger salamander.

The Proposed Action would also not likely have an adverse effect on upland habitat for California tiger salamander. This species is not likely to use the low-flow channel for upland aestivation or foraging habitat. The presence of water seasonally within the bypass may restrict dispersal of California tiger salamanders under baseline conditions, and the Proposed Action would not substantially change conditions.

Critical Habitat for California Tiger Salamander. Critical habitat for California tiger salamander has been designated on alluvial terraces adjacent to Reach 1A of the San Joaquin River (Unit 1B). Of the 3,003 acres in the unit, 19 acres of critical habitat (0.6 percent of the unit) extend into the river corridor along the north bank of the river. Given that release of the WY 2010 Interim Flows would be confined to the river channel and that riverine habitats are generally unsuitable for California tiger salamander, the Proposed Action is not expected to affect any of the primary constituent elements of critical habitat for this species. Therefore, the Proposed Action would not adversely modify critical habitat for California tiger salamander.

Recovery Plan for California Tiger Salamander. A recovery plan for California tiger salamander has not been developed yet, and recovery goals for this species have not been identified in other recovery plans.

Blunt-Nosed Leopard Lizard

The blunt-nosed leopard lizard is associated with alkali scrub habitat or other sparsely vegetated habitats with sandy soils. Blunt-nosed leopard lizards use the burrows of small rodents for shelter, predator avoidance, and behavioral thermoregulation. They are not expected to be found in riverine or riparian habitats in the Action Area, but could be found in portions of the Eastside and Mariposa bypasses.

The Eastside and Mariposa bypasses cut through upland habitats that could provide suitable habitat for blunt-nosed leopard lizard. They are known to occur adjacent to the Eastside Bypass on the Merced NWR (CNDDB 2009). Under baseline conditions, the Eastside and Mariposa bypasses are periodically inundated by flood flows, which likely reduces the suitability of habitat for blunt-nosed leopards within these areas. However, because flood flows occur seasonally and vary in magnitude between years, some potential exists for blunt-nosed leopard lizard to be present in areas that would be inundated by the WY 2010 Interim Flows if individuals from existing populations outside of the levees moved into the low-flow channel when conditions were dry. If present, some individuals might not be able to escape rising flow waters that could ramp up during spring.

As a conservation measure for the Proposed Action described in Section 3.5.2, "Conservation Measures," surveys to identify habitat and species presence would be conducted between April 15 and July 15, 2009, when the species is most active. Additional surveys would be conducted between August 1 and September 15, 2009, when hatchlings and subadults are most commonly observed. If surveys document the presence of blunt-nosed leopard lizard in an area that would likely be inundated by WY 2010 Interim Flows, then flows would not be released into the occupied area of the Eastside Bypass. If surveys confirm the presence of blunt-nosed leopard lizard, then WY 2010 Interim Flows may not be released into that area. If an area in the Eastside Bypass presumed to contain suitable habitat for blunt-nosed leopard lizard would likely be inundated by WY 2010 Interim Flows but has not been surveyed, then WY 2010 Interim Flows would not be released into the bypass. Therefore, releasing the WY 2010 Interim Flows would not have a direct adverse effect on blunt-nosed leopard lizard.

Critical Habitat for Blunt-Nosed Leopard Lizard. No critical habitat for blunt-nosed leopard lizard has been designated; therefore, the Proposed Action would not adversely modify critical habitat for this species.

Recovery Plan for Blunt-Nosed Leopard Lizard. Recovery goals for the blunt-nosed leopard lizard are identified in *the Draft Recovery Plan for Upland Species of the San Joaquin Valley, California* (USFWS 1998a). A 5-year status review for blunt-nosed leopard lizard was initiated in 2006, but has not been published. The Proposed Action is unlikely to have an adverse effect on recovery goals for blunt-nosed leopard because the Interim Flows would be limited to 1 year in duration and would not affect an area containing important habitat for the species.

Giant Garter Snake

The giant garter snake has been observed at the San Luis, Kesterson, and West Bear Creek units of the San Luis NWR Complex, in the Mendota Wildlife Area, and at the Mendota Pool (Dickert 2005), and south of the San Joaquin River in Fresno Slough (USFWS 2006b); however, no sightings of giant garter snakes south of the Mendota Wildlife Area have occurred since the time of listing (Hansen 2002). The Restoration Area is located within the San Joaquin Valley Recovery Unit, as described in the draft recovery plan for the species. This species may occur in suitable habitat in other locations in the Action Area. Although it generally avoids large, wide rivers, it may occur in the portions of the San Joaquin River channel that would be inundated by the release of WY 2010 Interim Flows.

The WY 2010 Interim Flows would increase the volume and availability of water in the river channel between early spring and midsummer, which is the active period for this species. Because the giant garter snake requires aquatic habitat for breeding and foraging during spring and summer, the presence of additional flows during these seasons would have a beneficial effect on this species by increasing the availability and reliability of aquatic habitats. Although the increase in water flow could increase water velocities in the river channel, the direct effect on giant garter snake is expected to be negligible because the main channel (reaches 1-5) currently do not provide suitable aquatic habitat due to the lack of summer flows (see table 3-2), with the exception of Mendota Pool at the head of Reach 3. In the Mendota Pool between the San Joaquin River and Mendota Dam, however, velocity would not be substantially altered because, although hydraulically connected, most of the pool lies outside of the route of WY 2010 Interim Flows. Velocities within the pool’s backwater on the San Joaquin River would not increase substantially because of the pool’s width and volume.

The giant garter snake utilizes uplands adjacent to aquatic features for basking and aestivation. The WY 2010 Interim Flows would not have a measureable direct effect on upland habitats for this species because flows would be restricted to the river channel and immediately adjacent, lower floodplain surfaces and would not inundate upland habitat. Therefore, the potential effects of the WY 2010 Interim Flows on the giant garter snake would be beneficial (increasing available aquatic habitat during the species’ active season) or negligible (not resulting in measurable or detectable changes to water velocities in the Mendota Pool or inundating potentially suitable upland habitat).

Critical Habitat for Giant Garter Snake. Critical habitat has not been designated for giant garter snake; therefore, none would be adversely modified as a result of the WY 2010 Interim Flows.

Recovery Plan for Giant Garter Snake. Recovery goals for the giant garter snake are identified in the draft recovery plan for giant garter snake (USFWS 1999a). The WY 2010 Interim Flows are unlikely to have a substantial effect on recovery goals for giant garter snake because the Interim Flows would be limited to 1 year in duration.

Western Yellow-Billed Cuckoo

Most recent records of the western yellow-billed cuckoo are in the Sacramento Valley (Gaines and Laymon 1984). An area near the confluence of the Tuolumne and San Joaquin rivers where a few cuckoos were observed regularly in the late 1960s was subsequently subject to intensive logging, and no cuckoos have been observed in recent years (Reeve, pers. comm., 1998, cited in McBain and Trush 2002). The yellow-billed cuckoo has been considered a rare migratory species during the spring in Stanislaus County (Reeve 1988). This species has potential to nest in suitable habitat in the Restoration Area. It also may occur in suitable habitat in other locations in the Action Area, including along portions of the San Joaquin River channel that would be inundated by the release of WY 2010 Interim Flows.

The nests of western yellow-billed cuckoos would be expected to be well above the waterline during the breeding season (approximately mid-June through mid-August). The WY 2010 Interim Flows could progressively increase nonflood flows during February, March, April, and May throughout the Restoration Area. The potential exists for increased flows to inundate nest sites if they are established before releases, which would result in nest abandonment and the loss of any viable eggs or chicks that have not yet fledged. However, these areas already experience periodic flood flows during spring, and Interim Flows would generally be at nearly their highest levels by March 16 (Table 3-3), before the nesting season of the western yellow-billed cuckoo. Western yellow-billed cuckoos would migrate into the Restoration Area or downstream along the San Joaquin River from late May until late June and would naturally construct their nests above the levels of Interim Flows. Furthermore, the number of nests established below the levels of Interim Flows during the breeding season is expected to be low, given the prevalence of surrounding habitats that are suitable. Therefore, the WY 2010 Interim Flows would not result in any measurable or detectable adverse direct effects on the western yellow-billed cuckoo.

Critical Habitat for Western Yellow-Billed Cuckoo. Critical habitat has not been designated for western yellow-billed cuckoo; therefore, none would be adversely modified as a result of the WY 2010 Interim Flows.

Recovery Plan for Western Yellow-Billed Cuckoo. A recovery plan for western yellow-billed cuckoo has not been developed yet, and recovery goals for this species have not been identified in other recovery plans.

Least Bell's Vireo

By 1980, this species was extirpated from the entire Central Valley, although the species' range is currently expanding northward (RHJV 2004); Least Bell's vireos successfully nested at the San Joaquin River NWR in 2005 and 2006 (USFWS 2006c). The least Bell's vireo nests in dense, low, shrubby vegetation, generally in riparian areas but also brushy fields, young second-growth forest or woodland, scrub oak, coastal chaparral, and mesquite brushlands, where it may build nests as low as 1 foot from the ground. This species may occur in suitable habitat in other locations in the Action Area, including along portions of the San Joaquin River channel that would be inundated by the release of WY 2010 Interim Flows.

Because the Proposed Action would have only a minimal effect on riparian habitats downstream from the Merced River (see discussion above), the WY 2010 Interim Flows would not result in any measurable or detectable adverse affects on the riparian habitats around the San Joaquin NWR or on least Bell's vireos that may be nesting there.

Should this species nest in other riparian areas upstream from the Merced River, its nests would be expected to be well above the waterline during the breeding season (approximately February through August). The WY 2010 Interim Flows could progressively increase nonflood flows during February, March, April, and May throughout the Restoration Area. The potential exists for increased flows to inundate the nest sites of ground and low-vegetation nesters if the sites are established before releases, which would result in nest abandonment and the loss of any viable eggs or chicks that have not yet fledged. However, these areas already experience periodic flood flows during spring, and Interim Flows would generally be at nearly their highest levels by March 16 (Table 3-3), before the nesting season of the least Bell's vireo. The least Bell's vireo would migrate into the Restoration Area or downstream along the San Joaquin River in mid- to late April and would naturally construct its nests above the levels of Interim Flows. Furthermore, the number of nests established below the levels of Interim Flows during the breeding season is expected to be low, given the prevalence of surrounding habitats that are suitable. Therefore, the WY 2010 Interim Flows would not result in any measurable or detectable adverse direct effects on the least Bell's vireo.

Critical Habitat for Least Bell's Vireo. Critical habitat has been designated for least Bell's vireo; however, because the critical habitat is not located within the Action Area, none would be adversely modified as a result of the WY 2010 Interim Flows.

Recovery Plan for Least Bell's Vireo. A draft recovery plan for Least Bell's Vireo has been prepared (USFWS 1998b). The plan does not identify recovery goals specific to the Action Area. However, it does identify a goal of protecting and managing riparian habitats within the species' historical range. The Proposed Action is unlikely to have a substantial effect on recovery goals for least Bell's vireo because the WY 2010 Interim Flows would be limited to 1 year in duration.

Riparian Brush Rabbit

The riparian brush rabbit has very limited distribution along the lower portions of the San Joaquin and Stanislaus rivers. Recent captive breeding and recovery efforts have included establishing one population in 2002 in restored habitat on the San Joaquin River NWR and releasing another small population in 2005 on private lands adjacent to the San Joaquin River NWR, west of Modesto. Other known populations are from Caswell Memorial State Park near Ripon, and in Paradise Cut and along the San Joaquin River west of Manteca. Riparian brush rabbits are not expected to occur upstream from the confluence with the Merced River. Because the WY 2010 Interim Flows would have only a minimal effect on riparian habitats downstream from the Merced River (see discussion above), the Proposed Action would not result in any measurable or detectable adverse direct effects on the riparian brush rabbit.

Critical Habitat for Riparian Brush Rabbit. Critical habitat has not been designated for riparian brush rabbit; therefore, none would be adversely modified as a result of the WY 2010 Interim Flows.

Recovery Plan for Riparian Brush Rabbit. Recovery goals for the riparian brush rabbit are identified in the *Draft Recovery Plan for Upland Species of the San Joaquin Valley, California* (USFWS 1998a). The Proposed Action is unlikely to have a substantial effect on recovery goals for riparian brush rabbit because the Interim Flows would be limited to 1 year in duration.

San Joaquin (Riparian) Woodrat

Although the San Joaquin Valley (or riparian) woodrat was historically found along the San Joaquin, Stanislaus, and Tuolumne rivers and likely occurred throughout the riparian forests of the northern San Joaquin Valley, no occurrences of San Joaquin Valley woodrat have been documented within or in the vicinity of the Action Area. San Joaquin Valley woodrat builds stick houses in dense riparian vegetation at the base of trees or in tree cavities and canopies. Potentially suitable habitat for San Joaquin Valley woodrat exists in riparian vegetation that would be inundated by WY 2010 Interim Flows. However, because the only verified extant population of San Joaquin Valley woodrat is located on the Stanislaus River at Caswell Memorial State Park (USFWS 1998a), which is outside the Action Area, the WY 2010 Interim Flows would not result in any adverse direct effects on this species.

Critical Habitat for San Joaquin Valley Woodrat. Critical habitat has not been designated for San Joaquin Valley woodrat; therefore, none would be adversely modified as a result of the WY 2010 Interim Flows.

Recovery Plan for San Joaquin Valley Woodrat. Recovery goals for the San Joaquin Valley woodrat are identified in the *Draft Recovery Plan for Upland Species of the San Joaquin Valley, California* (USFWS 1998b). The Proposed Action is unlikely to have a substantial effect on recovery goals for San Joaquin Valley woodrat because the Interim Flows would be limited to 1 year in duration.

Fresno Kangaroo Rat

The Fresno kangaroo rat has been reported in the vicinity of the Restoration Area, having been observed at the Alkali Sink Ecological Reserve and Mendota Wildlife Management Area. However, this species is considered by some to be extirpated along the San Joaquin River because of repeated negative findings during survey efforts since 1993 (DFG 2005). Flooding of habitat by the San Joaquin River has been considered a potential threat to this species; however, the Fresno kangaroo rat generally does not occupy riparian areas, although it may disperse through dry river washes. Further, this species tends to have a small home range and is not expected to regularly disperse across the river channel. Suitable upland habitats and occupied burrows may be located adjacent to the Action Area; however, this species would not be affected along any reach or bypass because the WY 2010 Interim Flows would be restricted to the river channel and lower floodplain surfaces. Therefore, the Proposed Action would not result in any adverse direct effects on this species given that its optimal habitat is located outside of the low-flow channel, which would be inundated by the WY 2010 Interim Flows.

Critical Habitat for Fresno Kangaroo Rat. Critical habitat has been designated for Fresno kangaroo rat; however, because this critical habitat is not located within the Action Area, none would be adversely modified as a result of the WY 2010 Interim Flows.

Recovery Plan for Fresno Kangaroo Rat. Recovery goals for Fresno kangaroo rat are identified in the *Draft Recovery Plan for Upland Species of the San Joaquin Valley, California* (USFWS 1998a). The Proposed Action is unlikely to have a substantial effect on recovery goals for Fresno kangaroo rat because the WY 2010 Interim Flows would be restricted to the river channels.

San Joaquin Kit Fox

San Joaquin kit fox is not expected to occur in riparian or riverine habitats that encompass most of the Action Area. This species prefers open grassland or scrub habitats and creates burrows for denning and refuge. Although occupied dens may be located near the river corridor, they would not be affected along any reach by the release of Interim Flows. Water from the flow releases would be restricted to the low-flow channel and adjacent lower floodplain surfaces, which are characterized by open water, riverwash, emergent wetland, and riparian scrub and forest. These habitats are not suitable for denning. The Eastside and Mariposa bypasses may provide suitable upland habitat used for foraging and dispersal. Implementing the Proposed Action would not affect the ability of San Joaquin kit fox to carry out these activities, because the species is mobile and wide ranging and often uses road crossings and culverts to traverse aquatic features. Because the WY 2010 Interim Flows are not expected to inundate dens, or restrict movement of San Joaquin kit fox, the Proposed Action would not result in any adverse direct effects on the species.

Critical Habitat for San Joaquin Kit Fox. Critical habitat has not been designated for San Joaquin kit fox; therefore, none would be adversely modified as a result of the WY 2010 Interim Flows.

Recovery Plan for San Joaquin Kit Fox. Recovery goals for San Joaquin kit fox are identified in the *Draft Recovery Plan for Upland Species of the San Joaquin Valley, California* (USFWS 1998a). The Action Area includes areas identified as important to the recovery of the species. The WY 2010 Interim Flows is unlikely to have a substantial effect on recovery goals for San Joaquin kit fox because the Interim Flows would be restricted to the river channels, which are seasonally inundated under existing conditions and are unlikely to provide important habitat for the species.

6.2 Interrelated and Interdependent Effects

Interrelated actions are those that are part of a larger action and depend on the larger action for their justification (50 Code of Federal Regulations 402.02). Interdependent actions are those that have no significant independent utility apart from the action that is under consultation. Interrelated and interdependent actions are activities that would not occur “but for” the WY 2010 Interim Flows.

The joint USFWS/NMFS ESA Handbook explains (on page 4-27) how an existing dam is considered as part of the baseline when USFWS and NMFS consult on a later, related action and conclude that a preexisting dam has independent utility (USFWS and NMFS 1998), and therefore is not interrelated to or interdependent with the Proposed Action. Ongoing effects of the existing dam are already included in the environmental baseline and would not be considered an effect of the Proposed Action under consultation. Thus, if a dam can exist independent of the Proposed Action, the operation of the dam is not interrelated or interdependent and effects of the dam are not considered as part of the effects of the Proposed Action under consultation, but as part of the environmental baseline.

Interrelated effects of implementing the WY 2010 Interim Flows include a negligible increase in Delta inflow from the San Joaquin River and correspondingly negligible increase in exports at the Jones and Banks facilities. The Jones and Banks export facilities are located in the south Delta and are connected by Old and Middle rivers to the San Joaquin River near where it enters the Delta. When the export pumps are not operating, flows in Old and Middle rivers move from the upstream reaches that join the San Joaquin River in the southeastern Delta to the downstream reaches that join the lower portion of the river. However, when the pumps are operating, they often export such large volumes of water that flow in the downstream portions of Old and Middle rivers moves upstream toward the pumps.

The USFWS 2008 OCAP BO for delta smelt restricts reverse flows in the Old and Middle river channels downstream (and north) of the export facilities. To meet water management objectives of WY 2010 Interim Flows, the increased Delta inflow from the San Joaquin River would lead to increased Delta export pumping when pumping could occur within regulatory constraints such as the USFWS 2008 OCAP BO for delta smelt. This increased export pumping would have little effect on Old and Middle river flows but would increase flow in the upstream portions of Old and Middle rivers and other channels leading from the San Joaquin River to the export facilities. A substantial portion of the increased San Joaquin River inflow would likely not be recirculated, resulting in increased flow in the San Joaquin River through the Delta.

Old and Middle river flow would rarely, if at all, be affected by the WY 2010 Interim Flows because of the new reverse-flow restrictions required under the 2008 OCAP BO. Surveys of adult delta smelt during their spawning migrations rarely find the adults upstream from where Old and Middle rivers join the downstream portion of the San Joaquin River (http://www.delta.dfg.ca.gov/data/skt/DisplayMaps.asp), so the increased flows toward the pumps in the upstream channels of the Delta would likely have little effect on delta smelt. Increased flow in the lower portion of the San Joaquin River would likely benefit the smelt during their upstream and downstream migrations by providing stronger environmental cues and transport flows, resulting in less straying of the fish into the south Delta.

Implementing the WY 2010 Interim Flows may increase diversions by a small percentage at the Jones and Banks export facilities. The increased diversions may affect entrainment of delta smelt close to the facilities or in channels with flows moving toward the pumps. However, delta smelt rarely occur in the southeastern Delta. In addition, the increased flows in the lower Delta portion of the San Joaquin River expected to occur under WY 2010 Interim Flows would likely reduce the straying of delta smelt toward the south Delta or the export facilities. Although the risk of entrainment for delta smelt in the south Delta would be increased because of the slight increases in exports, the risk of smelt occurring at these locations would be reduced because of the higher San Joaquin River flows. Therefore, implementing the WY 2010 Interim Flows is anticipated to have no net effect on delta smelt entrainment. Furthermore, the regulatory requirements embodied in the USFWS 2008 OCAP BO for delta smelt would remain in effect during WY 2010 and would be applicable to the WY 2010 Interim Flows project. These regulatory requirements would ensure that allowable take limits at the Delta export facilities would not be exceeded.

Flow from the San Joaquin River towards the pumps are expected in the upstream section of Old and Middle rivers, where the emigrating steelhead are at risk, but not in the downstream section of Old and Middle rivers north of the pumps, where delta smelt and other sensitive species would be at risk. The 2008 OCAP BO for delta smelt places restrictions on reverse flows in the Old and Middle river sections. Therefore, the potential increase in export pumping, would have little effect on Old and Middle river flows but would increase flow in the upstream portions of Old and Middle rivers and other channels leading from the San Joaquin River to the export facilities.

Because the CVP and SWP operations, including export activities, affect fish and wildlife in the Central Valley, Reclamation consulted with both USFWS and NMFS under Section 7 of the ESA. The most recent consultation has been completed with USFWS for delta smelt (BO published in 2008). NMFS is currently preparing their BO for Sacramento River winter-run Chinook salmon ESU, Central Valley spring-run Chinook salmon ESU, Central Valley steelhead DPS, and North American green sturgeon, with the expected release date in June 2009. Therefore, any adverse effects from increased pumping would be limited by regulatory restrictions included in the pending NMFS OCAP BO. The WY 2010 Interim Flows would not increase take above acceptable limits established by the NMFS OCAP BO for Banks and Jones pumping plants. Therefore, the Proposed Action is not likely to adversely affect Central Valley steelhead.

6.2.1 EFH

The WY 2010 Interim Flows include an increase in exports at the Jones and Banks facilities in the south Delta to recirculate some of the increased flow provided for the WY 2010 Interim Flows. The WY 2010 Interim Flows also include an increase in San Joaquin River inflow, which would increase flow in the river through the Delta.

As described for delta smelt above, the increased inflows are expected to reduce the straying of starry flounder into the south Delta, and the increase in exports may increase entrainment but the regulatory requirements embodied in the USFWS 2008 OCAP BO for delta smelt would remain in effect during WY 2010 and would be applicable to the WY 2010 Interim Flows project. These regulatory requirements would ensure that allowable take limits at the Delta export facilities would not be exceeded, which would also provide additional protection for starry flounder. These two effects are expected to offset one another, resulting in no net effect on starry flounder EFH.

As described above, protective measures anticipated in the NMFS BO would protect Pacific salmon. Therefore, there would be no effect on Pacific salmon EFH.

6.3 Cumulative Effects

Cumulative effects, as defined under Section 7 of the ESA and implementing regulations, include the effects of future State, local, or private actions that are reasonably certain to occur in the Action Area. Future Federal actions, including other SJRRP actions, are not addressed as cumulative effects under Section 7 of the ESA. For each listed species, this section addresses the additive impact of the Proposed Action and all foreseeable, non-Federal, future actions. These impacts are addressed separately for fisheries and for terrestrial plants and wildlife.

6.3.1 Methodology and Approach

For purposes of assessing cumulative effects, the Action Area consists of all areas directly or indirectly affected by the Federal action (USFWS and NMFS 1998). Listed fish species would be affected by WY 2010 Interim Flows throughout the Action Area defined in Section 1.3, “Action Area.” Listed terrestrial plants and wildlife, however, would be affected only within the Restoration Area (i.e., those reaches of the San Joaquin River and flood bypasses between Friant Dam and the Merced River that would receive WY 2010 Interim Flows).

Several actions are ongoing or planned in the Restoration Area and elsewhere in the Action Area. These actions include water resource projects, resource management plans and programs, and development projects (see Appendix C for a detailed description). Most of these projects, however, are likely to involve Federal funding and/or permitting, and are therefore not considered cumulative under the ESA. However, some of these actions may not involve Federal funding and/or permitting (e.g., some private development and some management activities). Also, an undetermined number of future actions could go forward without a Section 404 permit to fill wetlands, an incidental-take permit through Section 10 of the ESA, or other Federal action. Future State or private actions that could potentially affect listed species include actions that affect or result in any of the following:

- Habitat conversion or fragmentation.
- Herbicide or pesticide applications.
- Vegetation management, including along waterways,
- Grazing practices,
- Crop selection (including crop types cultivated, fallowing or idling of cropland, and abandonment of agricultural land),
- Ground-disturbing activities (including ripping of soils),
- Discharge of contaminants into waterways,

- Presence of humans along waterways on agricultural lands, or in natural vegetation,
- Predator abundance (e.g., coyotes),
- Dispersal and establishment of invasive species,
- Flow regimes of waterways,
- Use of off-road vehicles and traffic levels on local roads.

All of these activities and scenarios can degrade habitat or cause the injury or death of listed species. These activities regularly change in response to market conditions and new technologies. For some of these activities (such as some agricultural practices), attempting to predict future changes and their consequences for listed species would be speculation. Nonetheless, the vulnerability of listed species to different types of actions varies, many actions are associated with particular land uses or management practices, and the distribution of potential habitat with regard to existing and planned land uses is known. Therefore, this analysis uses these known relationships between types of non-Federal actions and effects on species, and among habitats, non-Federal actions, and land use, as the primary basis for evaluating the cumulative effects of foreseeable future actions.

Data sources for this analysis included existing and available information summarized in the environmental baseline and species accounts (see Chapters 4 and 5), and review of land use designations of applicable general plans, land ownership, and Williamson Act contract data.

6.3.2 Cumulative Effects on Fisheries

Fish could be affected by projects that could result in disruption of stream banks or degradation of water quality through herbicide or pesticide applications; vegetation management along waterways; grazing practices, and ground-disturbing activities.

The success of fish populations has been linked to levels of turbidity and siltation in a watershed. Prolonged exposure to high levels of suspended sediment can create a loss of visual capability, leading to a reduction in feeding and growth rates; a thickening of the gill epithelium, potentially causing the loss of respiratory function; a clogging and abrasion of gill filaments; and increases in stress levels, reducing the tolerance of fish to disease and toxicants (Waters 1995).

Also, high suspended sediment levels will cause the movement and redistribution of fish populations and can affect physical habitat. Once the suspended sediment is deposited, it can reduce water depths in pools, decreasing the water's physical carrying capacity for juvenile and adult fish (Waters 1995). Increased sediment loading can also degrade food-producing habitat downstream of the project area. Sediment loading can interfere with photosynthesis of aquatic flora and result in the displacement of aquatic fauna.

Many fish, including juvenile salmonids, are sight feeders. Turbid waters reduce the fish's efficiency in locating and feeding on prey. Some fish, particularly juveniles, can get disoriented and leave areas where their main food sources are located, which can result in reduced growth rates.

Avoidance is the most common result of increases in turbidity and sedimentation. Fish will not occupy areas that are not suitable for survival, unless they have no other option. Therefore, habitat can become limiting in systems where high turbidity precludes a species from occupying habitat required for specific life stages.

Additional cumulative effects may result from exposures to contaminants in discharges from point and nonpoint sources. These contaminants include selenium and numerous pesticides and herbicides associated with discharges related to agricultural and urban activities. Contaminants may injure or kill salmonids by affecting food availability, growth rate, susceptibility to disease, or other physiological processes necessary for survival. Laboratory studies show that sublethal concentrations of pesticides can affect many aspects of salmon biology, including a number of behavioral effects such as avoidance, delayed migration, and increased stress rendering them more susceptible to predation (http://www.krisweb.com/stream/pesticide_fisheffects.htm).

6.3.3 Cumulative Effects on Terrestrial Plants and Wildlife

Vernal Pool Plant Species

Plant species occurring in vernal pool landscapes in or near the Restoration Area include succulent owl's clover, Colusa grass, San Joaquin Valley Orcutt grass, and hairy Orcutt grass. In and near the Restoration Area, vernal pool landscapes have been eliminated or fragmented by conversion to agricultural and developed uses, and remaining vernal pools have been degraded by the activities associated with these uses (e.g., alteration of hydrology, deep ripping of soils). Also, invasive plant species (e.g., nonnative annual grasses) have become abundant in most vernal pool landscapes and degraded their habitat value for native species.

Vernal pool landscapes remain near the Restoration Area north and south of San Joaquin River Reach 1A, in and near the Restoration Area along Reaches 4B and 5, and along the bypasses. Land near Reach 1A is in a mix of natural vegetation, cropland, and developed land uses. The remaining vernal pool landscapes are primarily in private ownership, and are designated in general plans for developed uses or open space; only a small portion of the land is under Williamson Act contracts. Along the bypasses, land is in natural vegetation or cropland, with the natural vegetation concentrated in a corridor along the flood bypass itself. General plans designate this land for agricultural uses or open space. Most remaining vernal pool landscapes are on public lands managed to sustain biodiversity (e.g., Grasslands Wildlife Management Area), and a substantial portion of the privately owned land is under Williamson Act contracts. Along Reaches 4B and 5 of the San Joaquin River, most remaining vernal pool complexes are on public land managed to sustain biodiversity (e.g., the San Luis NWR) and most privately owned land is under Williamson Act contracts. General plans designate all of these lands for agricultural uses.

Climate change and the spread of invasive species will affect all remaining vernal pool landscapes. However, other cumulative effects are not likely to eliminate or degrade vernal pool habitats, or to otherwise reduce the viability of populations of vernal pool plant species, along the bypasses or Reaches 4B and 5, because most remaining vernal pool landscapes in these areas are on public land managed by USFWS, DFG, or the California Department of Parks and Recreation.

Near Reach 1A of the San Joaquin River, however, non-Federal actions are likely to result in additional loss and degradation of vernal pool landscapes. Because of the mosaic of developed land uses, cropland, and natural vegetation in this area, the remaining vernal pool landscapes are already fragmented and experiencing degradation resulting from human activities such as off-road vehicle use, agricultural activities, and altered hydrology. Because population growth and additional conversion of natural vegetation to cropland or developed uses is likely to occur (particularly in areas already designated for developed land uses), additional loss, fragmentation, and degradation of vernal pool landscapes is likely near Reach 1A. These impacts may be substantial and may reduce the viability of vernal pool plant species in this area.

The Proposed Action would not contribute to these cumulative effects: Vernal pools have not been documented along the San Joaquin River or bypasses in areas seasonally inundated by river flows, and inundation of vernal pools would be avoided during implementation of WY 2010 Interim Flows. WY 2010 Interim Flows also would not alter agricultural practices potentially affecting vernal pool plant species in the Restoration Area or involve construction activities that may adversely affect vernal pool species.

Critical Habitat for Vernal Pool Plant Species

The cumulative effects on critical habitat for vernal pool plant species would be the same as the effects on vernal pool plants described previously. Critical habitat for hairy Orcutt grass, San Joaquin Orcutt grass, and succulent owl’s clover has been designated in the Restoration Area north of San Joaquin River Reach 1A, which is the area previously described as likely to experience additional loss, fragmentation, and degradation of vernal pool landscapes. Critical habitat for Colusa grass and Hoover’s spurge has been designated in Reach 4B and along the Eastside and Mariposa bypasses, which is the area previously described as experiencing little or no loss, fragmentation, or degradation as cumulative effects of non-Federal present and future actions. The WY 2010 Interim Flows would not affect the primary constituent elements of these critical habitats and thus would not contribute to cumulative effects.

Palmate-Bracted Bird’s-Beak

Palmate-bracted bird’s-beak grows in alkaline soils in scrub and grassland vegetation. In the Restoration Area, suitable habitat for this species has been substantially reduced, fragmented, and degraded by conversion of natural vegetation to agricultural and developed land uses, and by the activities associated with those land uses that affect remaining natural vegetation (e.g., uses of off-road vehicles and alterations to hydrology). Currently, the major threats to palmate-bracted bird’s-beak are loss or degradation of habitat from incompatible grazing practices, hydrological alternations, use of off-road vehicles, and conversion to agricultural and developed uses. Also, potential impacts from climate change are not well understood but could be considerable.

Palmate-bracted bird's-beak has been documented near the Restoration Area south of San Joaquin River Reach 2A and between the river and the Chowchilla Bypass; therefore, occupied or potentially suitable habitat may exist in the Restoration Area in Reaches 2A or 3, the Chowchilla Bypass, or possibly the upstream segment of the Eastside Bypass. In addition, alkali sink habitat exists south of the Restoration Area in the North Grasslands Wildlife Area. Land along San Joaquin River Reaches 2A and 3 and the bypasses is primarily privately owned, in agricultural use, and designated in general plans for agricultural use, and is also primarily under Williamson Act contracts. The main exception is land designated for developed land uses in Firebaugh in Reach 3; almost all of this land, however, is already in developed or agricultural use.

Therefore, additional conversion of habitat to urban land uses and an increase in activities associated with urbanization and increased population may not affect palmate-bracted bird's-beak in the Restoration Area. Rather, the primary future actions affecting palmate-bracted bird's-beak are related to agricultural activities. Agricultural activities potentially affecting this species, its pollinators, or their habitat include changes in grazing practices, use of off-road vehicles, herbicide use, and conversion of natural vegetation to row or field crops. Most (and possibly all) potential habitat in these portions of the Restoration Area is not managed to sustain biodiversity, and several agricultural activities could eliminate or degrade habitat; therefore, some additional loss or degradation of palmate-bracted bird's beak habitat is likely.

Occupied or potentially suitable habitat for palmate-bracted bird's beak habitat has not been documented along the San Joaquin River or bypasses in areas seasonally inundated by river flows, and inundation of potentially suitable habitat would be avoided during implementation of WY 2010 Interim Flows. Therefore, the Proposed Action would not contribute to cumulative effects on this species. Interim Flows also would not alter agricultural practices potentially affecting palmate-bracted bird's-beak in the Restoration Area.

Vernal Pool Invertebrates

Vernal pool invertebrates present in vernal pool landscapes in and near the Restoration Area include Conservancy fairy shrimp, longhorn fairy shrimp, vernal pool tadpole shrimp, and vernal pool tadpole shrimp. Cumulative effects on vernal pool landscapes in and near the Restoration Area were described previously (see "Vernal Pool Plant Species" above). Vernal pool invertebrates would also experience those cumulative effects. Vernal pool landscapes north of Reach 1A of the Restoration Area would likely experience additional loss, fragmentation, and degradation. Vernal pool landscapes in Reach 4B and along the Eastside and Mariposa bypasses are likely to experience little or no loss, fragmentation, or degradation as cumulative effects of present and future non-Federal actions. The Proposed Action would not affect vernal pool landscapes and thus would not contribute to these cumulative effects.

Critical Habitat for Vernal Pool Invertebrates

The effects on critical habitat for vernal pool plant species would be the same as the effects on vernal pool plants described previously. Critical habitat for vernal pool fairy shrimp has been designated in the Restoration Area north of San Joaquin River Reach 1A. These vernal pool landscapes are likely to experience additional loss, fragmentation, and degradation. Critical habitat for Conservancy fairy shrimp, longhorn fairy shrimp, vernal pool tadpole shrimp, and vernal pool tadpole shrimp has been designated in Reaches 4B and 5 of the San Joaquin River and along the Eastside and Mariposa bypasses. These vernal pool landscapes are likely to experience little or no loss, fragmentation, or degradation as cumulative effects of non-Federal present and future actions. The Proposed Action would not affect the primary constituent elements of these critical habitats and thus would not contribute to these cumulative effects.

Valley Elderberry Longhorn Beetle

Valley elderberry longhorn beetle is only found in association with its host plants, the elderberry shrub (*Sambucus* sp.), which grows in riparian vegetation. This species is threatened by habitat loss and by predation and displacement by the invasive Argentine ant.

The extent of valley elderberry longhorn beetle habitat has been substantially reduced throughout its range, including the Restoration Area. The San Joaquin River has changed dramatically since the early part of the 19th century. The river is now largely confined within constructed levees and bounded by agricultural and urban development, flows are regulated through dams and water diversions, and floodplain habitats have been fragmented and reduced in size and diversity (McBain and Trush 2002). As a result, the riparian communities and associated wildlife have substantially changed from historic conditions (Jones and Stokes 1998). The presence of Friant Dam reduces the frequency of scouring flows, which has resulted in a gradual decline of bare gravel and sandbar surfaces. Over time, the vegetation succession of riparian scrub to forest is no longer balanced by periodic loss of forest to the river caused by erosion and appearance of new riparian scrub on sand and gravel bars. In addition, operation of Friant Dam has caused the loss of gradually declining flows in spring, which are periodically necessary to disperse willow and cottonwood seeds and establish seedlings of these riparian tree and shrub species. Drought conditions caused by diversions have also caused riparian vegetation to be lost in several reaches of the river (e.g., Reaches 2 and 4A), and urban and agricultural development have caused a gradual loss of area available for riparian habitat (Jones and Stokes 1998).

In the Restoration Area, the remaining riparian vegetation is primarily in narrow corridors, which consist mainly of shrub-dominated scrubs, but also include narrow bands and some wider patches of riparian forest along all reaches of the San Joaquin River. In the bypass system, riparian vegetation consists of discontinuous narrow corridors and patches. Within the remaining riparian vegetation of the Restoration Area, elderberry shrubs are widespread in Reaches 1 and 2, and very sparsely distributed in Reaches 3, 4, and 5; their presence in the bypass system has not been documented.

The primary factors affecting the extent of native riparian vegetation (including elderberry shrubs) within the Restoration Area are (1) availability of sufficient surface water and groundwater to support plant establishment, growth, and survival; (2) spread of invasive, nonnative plants that displace native riparian vegetation; (3) disturbances that remove established riparian vegetation (e.g., levee maintenance activities, fires); and (4) adjacent land uses that constrain the maximum extent of riparian vegetation and are often the sources of invasive species and disturbances.

Non-Federal actions would affect some of these limiting factors, and their cumulative effects would differ among river reaches and bypasses. The availability of surface water and groundwater along the San Joaquin River is not anticipated to change substantially as a result of non-Federal actions. Invasive plants, however, are anticipated to continue to spread downstream. In Reach 1A, red sesbania and several other invasive species are already widespread and have displaced large areas of native vegetation. These species would likely become more abundant downstream, displacing native vegetation within remaining riparian areas (and resulting in a net replacement of native herbaceous and tree-dominated riparian vegetation with nonnative shrub-dominated vegetation). In addition, valley elderberry longhorn beetle could be affected by additional spread of Argentine ants within riparian vegetation in the Restoration Area; however, the current distribution and ongoing spread of Argentine ants in the Restoration Area is not known.

In the absence of changes to adjacent land uses or management of the river corridor, the frequency and effects of disturbances removing riparian vegetation would remain similar to existing conditions. However, non-Federal actions are likely to change land uses and management of the river corridor along Reach 1A. Much of the land in and adjacent to the Restoration Area in Reach 1A of the San Joaquin River is privately owned and designated for developed land uses, but is currently cropland or natural vegetation; these changes would likely increase the disturbance of riparian vegetation along Reach 1A. Along Reaches 1B–5, changes in land use would be more limited because most private land adjacent to the river corridor is cropland, designated in general plans for agricultural use, and under Williamson Act contracts. Also, along Reaches 4B and 5, a substantial portion of adjacent land is Federally or State owned and managed to sustain biodiversity. However, some land use changes could still occur along Reaches 1B–5, particularly the conversion of remaining natural vegetation on private land to cropland.

The cumulative effect of non-Federal actions would likely be a reduction in the extent and quality of valley elderberry longhorn beetle habitat, and this could reduce the valley elderberry longhorn beetle population within the Restoration Area. The Proposed Action would not increase these cumulative effects. WY 2010 Interim Flows may increase plant establishment or mortality at some locations, but these flows are unlikely to substantially alter the extent of existing riparian vegetation. Most elderberry shrubs are not anticipated to be inundated by WY 2010 Interim Flows, and these flows are not likely to result in loss of elderberry shrubs or any resident beetles. However, the invasive plant management included in the WY 2010 Interim Flows would limit the spread of these species for several years.

California Tiger Salamander

California tiger salamander is associated with vernal pool landscapes, and has been documented in vernal pool landscapes in the San Luis NWR and at Great Valley Grasslands State Park. It is threatened by the introduction of exotic predators (e.g., bullfrogs and mosquitofish), fragmentation of habitat, vehicle-related mortality, and rodent-control programs that result in loss of aestivation habitat.

Cumulative effects on California tiger salamander would be similar to those described previously for vernal pool plants. However, California tiger salamander would experience greater adverse effects from habitat fragmentation, and human activities in adjacent areas, because of its dispersal and seasonal movements. Like vernal pool plant species, and for the same reasons given previously, California tiger salamander would likely experience habitat loss and degradation and reduced population viability in vernal pool landscapes north and south of Reach 1A. However, except for the effects of climate change and the continued spread of invasive plants, cumulative effects are not likely to eliminate or degrade vernal pool habitats, or otherwise affect California tiger salamander along the bypasses or Reaches 4B and 5. The WY 2010 Interim Flows would not affect vernal pool landscapes, and thus it would not contribute to these cumulative effects.

Critical Habitat for California Tiger Salamander

Critical habitat for California tiger salamander abuts the Restoration Area on either side in San Joaquin River Reach 1A, and exists within the Restoration Area at one location along Reach 1A. The cumulative effects on California tiger salamander critical habitat would be the same as those described previously for California tiger salamander in vernal pool landscapes along Reach 1A. The Proposed Action would not contribute to these cumulative effects because it would not affect vernal pool landscapes, and thus would not affect the primary constituent elements of critical habitat for California tiger salamander.

Blunt-Nosed Leopard Lizard

Blunt-nosed leopard lizards are found in upland areas with sandy soils and scattered vegetation, throughout the San Joaquin Valley and adjacent foothills. A large portion—perhaps most—blunt-nosed leopard lizard habitat has been lost or fragmented by conversion to cropland or developed land uses, and much of the remaining habitat has been degraded by human disturbance and the spread of nonnative plants. Habitat loss, fragmentation, and degradation remain the primary threats to blunt-nosed leopard lizard.

Most upland vegetation in and near the Restoration Area has been converted to cropland or developed land uses. Remaining natural upland vegetation is fragmented, and to some extent degraded from past and ongoing human activities.

However, in uplands that remain in natural vegetation, some potential and/or occupied habitat may exist, including along the Eastside Bypass. Blunt-nosed leopard lizards would be most likely to use areas adjacent to alkali scrub habitat with sandy soils, rodent burrows, and sparse vegetation.

As for upland habitats in general, cumulative effects on remaining habitat for blunt-nosed leopard lizards would result in additional habitat loss, fragmentation, and degradation.

The WY 2010 Interim Flows would not add to these cumulative effects. At present, all reaches that would receive WY 2010 Interim Flows are seasonally inundated, with the exception of Reaches 2A and 2B and portions of the Eastside Bypass, which are periodically inundated by flood flows periodically. The portions of Reaches 2A and 2B that could be inundated by WY 2010 Interim Flows are characterized by sandy riverwash and gravelly substrate. Habitat conditions in these areas are not highly suitable, and the presence of blunt-nosed leopard lizard is unlikely. Furthermore, the WY 2010 Interim Flows includes a measure to avoid affecting habitat occupied by blunt-nosed leopard lizard.

Giant Garter Snake

Giant garter snake is an aquatic snake found in aquatic and emergent wetland habitats (e.g., along ditches and canals, in rice fields) and adjacent uplands. In the San Joaquin Valley, the distribution and abundance of this species has been substantially reduced. In and near the Restoration Area, giant garter snake occurs in suitable habitat in the San Luis NWR Complex, in the Mendota Wildlife Area, and at the Mendota Pool, and is expected to occur in suitable habitat elsewhere in the Restoration Area. The species is threatened by habitat loss and fragmentation from expansion of urban areas, and habitat degradation from incompatible agricultural practices (e.g., intensive vegetation control along canals and ditches).

Effects of present and future non-Federal actions on giant garter snakes and their aquatic and wetland habitats are similar to the effects described previously for riparian habitats (see “Valley Elderberry Longhorn Beetle” above): some loss or disturbance of habitat from localized changes in land use or agricultural practices, and spread of invasive plants converting herbaceous-dominated riparian scrub and wetland vegetation to vegetation dominated by nonnative shrubs. However, the extent of these cumulative effects on giant garter snakes and their habitat would be less than described for riparian vegetation because a greater portion of giant garter snake habitat is on Federal and State land managed to sustain biodiversity.

The cumulative effect of non-Federal actions would likely be some reduction in the extent and quality of giant garter snake habitat, and this could reduce the snake population with the Restoration Area. The Proposed Action would not increase these cumulative effects. WY 2010 Interim Flows would be unlikely to substantially alter the extent or quality of existing habitat, although the increase in flow may enhance some giant garter snake habitat. Also, invasive plant management included in the WY 2010 Interim Flows would limit the spread of these species for several years, and thus reduce their degradation of giant garter snake habitat.

Western Yellow-Billed Cuckoo

Western yellow-billed cuckoos typically breed in broad, well-developed, and relatively closed-canopied, riparian forest composed of mature willows and cottonwoods. The development of water storage and flood control systems and the associated expansion of agricultural and developed land uses during the 20th century eliminated the vast majority of the Central Valley’s nesting habitat for yellow-billed cuckoo. Habitat loss remains the primary threat for this species.

As described previously (see “Valley Elderberry Longhorn Beetle” above), a substantial reduction in riparian habitat has occurred, particularly as a result of the construction of Friant Dam and the existing flood control system, and associated conversion of historical floodplain to cropland. The remaining riparian vegetation is primarily in narrow corridors, which are primarily shrub-dominated scrubs, but also includes narrow bands and some wider patches of riparian forest along all reaches of the San Joaquin River. Although yellow-billed cuckoo has not been documented as nesting in the Restoration Area during recent decades, it could potentially nest in these forests.

Most potential nesting habitat for yellow-billed cuckoo in the Restoration Area is of marginal quality and located along the San Joaquin River. As described previously (see “Valley Elderberry Longhorn Beetle” above), the extent of riparian vegetation and the quality of riparian habitats are expected to be reduced by the cumulative effect of non-Federal actions. In particular, invasive plants are likely to continue to spread through riparian areas along the San Joaquin River, and would likely reduce the extent of riparian forest providing suitable nesting habitat for yellow-billed cuckoo. The WY 2010 Interim Flows would reduce this cumulative effect because it includes a measure that would limit the expansion of invasive plant populations for several years.

Least Bell’s Vireo

The primary threats to least Bell’s vireo are habitat loss and nest parasitism by brown-headed cowbird. Threats also include trampling of vegetation and nests by livestock and humans, and habitat degradation resulting from the spread of invasive plants, particularly giant reed.

Least Bell’s vireo historically nested in riparian vegetation throughout the Restoration Area, but was extirpated from the Central Valley by 1980. The species is now expanding its range, and in 2005 and 2006, least Bell’s vireos successfully nested at the San Joaquin River NWR.

As described previously (see “Valley Elderberry Longhorn Beetle” above), the extent and habitat quality of riparian vegetation are expected to be reduced by the cumulative effect of non-Federal actions. In particular, invasive plants are likely to continue to spread through riparian areas along the San Joaquin River, and would likely reduce the extent of suitable nesting habitat for least Bell’s vireo. Also, potential nesting habitat could experience greater disturbance from human activities along Reach 1A of the San Joaquin River. The Proposed Action would not add to these cumulative effects. Least Bell’s vireos would migrate into the Restoration Area sometime in April and would naturally construct their nests above the level of Interim Flows. Furthermore, the number of nests established below the levels of Interim Flows during the breeding season is expected to be low, given the rarity of nesting lest Bell’s vireos in the Restoration Area and the prevalence of surrounding habitats suitable for nesting.

Riparian Brush Rabbit

Riparian brush rabbit inhabits riparian vegetation, but has been extirpated from the Delta and most of the lower San Joaquin River and its tributaries. Currently, this species has a very limited distribution along the lower portions of the San Joaquin and Stanislaus rivers, and is not expected to occur upstream from the confluence with the Merced River.

Riparian habitats along the San Joaquin River from the Merced River to the Delta and along the lower Stanislaus River would experience cumulative effects comparable to those in the Restoration Area (see “Valley Elderberry Longhorn Beetle” above). These cumulative effects on riparian areas would likely adversely affect riparian brush rabbit. The WY 2010 Interim Flows would not add to these cumulative effects. WY 2010 Interim Flows would have only a minimal effect on riparian habitats downstream from the Merced River; thus no impact on riparian brush rabbit would occur.

Fresno Kangaroo Rat

Fresno kangaroo rats live in alkali scrub habitat, but may be extirpated from the Restoration Area. The primary threats to Fresno kangaroo rat are habitat loss from expansion of cropland and developed land uses, and incompatible grazing practices.

As described previously (see “Palmate-Bracted Bird’s-Beak” above), alkali scrub habitats in the Restoration Area have been substantially reduced, fragmented, and degraded by conversion of natural vegetation to agricultural and developed land uses, and by the activities associated with those land uses that affect remaining natural vegetation (e.g., use of off-road vehicles and alterations to hydrology). The primary future actions affecting alkali scrub are related to agricultural activities, including changes in grazing practices, use of off-road vehicles, and conversion of natural vegetation to row or field crops. Because most—and possibly all—potential habitat in these portions of the Restoration Area is not managed to sustain biodiversity, and various agricultural activities could eliminate or degrade habitat, some additional loss or degradation of Fresno kangaroo rat habitat is likely.

Occupied or potentially suitable habitat for Fresno kangaroo rat has not been documented along the San Joaquin River or bypasses in areas seasonally inundated by river flows, and inundation of potentially suitable habitat would be avoided during implementation of WY 2010 Interim Flows. Therefore, the WY 2010 Interim Flows would not contribute to cumulative effects. WY 2010 Interim Flows also would not alter agricultural practices potentially affecting Fresno kangaroo rat in the Restoration Area.

San Joaquin (Riparian) Woodrat

The San Joaquin Valley woodrat lives in riparian areas, primarily riparian forest with a dense shrub understory. Historically, this species likely occurred throughout the northern San Joaquin Valley, but it currently has a very limited distribution at the confluence of the San Joaquin and Stanislaus rivers. It is not expected to occur upstream from the Merced River. The primary threats to San Joaquin Valley woodrat are habitat loss by conversion to cropland or clearing of vegetation, and habitat disturbance.

Riparian habitats along the lower San Joaquin River and the Stanislaus River would experience cumulative effects comparable to those in the Restoration Area (see “Valley Elderberry Longhorn Beetle” above), and these cumulative effects are likely to adversely affect San Joaquin Valley woodrat. The Proposed Action would not add to these cumulative effects. Because Interim Flows would have only a minimal effect on riparian habitats downstream from the Merced River, no impact on San Joaquin Valley woodrat would occur.

San Joaquin Kit Fox

San Joaquin kit fox is a wide-ranging carnivore that uses primarily grassland, seasonal wetland, and open scrubs and woodlands. The distribution and abundance of this species have been substantially reduced by the loss and fragmentation of habitat by conversion of natural vegetation to cropland and developed land uses, human disturbance, rodenticide use, and competitive displacement and predation by the domestic dog, red fox, and coyote.

Most natural upland vegetation in and near the Restoration Area has been converted to cropland or developed land uses. The remaining natural upland vegetation is fragmented and degraded to some extent by disturbances originating from adjacent agricultural and developed land uses. Developed and agricultural land uses have also increased the density of domestic dogs and coyotes that displace San Joaquin kit fox. However, this species still occupies some of the remaining grassland and scrub habitats in the Restoration Area.

Present and future non-Federal actions could result in additional degradation and loss of upland habitats. Also, an increased human population within the region would likely increase the abundance of coyotes and dogs that could displace San Joaquin kit fox. Potential effects of climate change and further spread of invasive species on San Joaquin kit fox are not known.

The Proposed Action would not add measurably to these cumulative effects. WY 2010 Interim Flows would not inundate occupied dens, nor would they interfere with foraging or dispersal through the river corridor or the Eastside Bypass.

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7.0 Conclusions

7.1 Aquatic Species

The Proposed Action is not likely to adversely affect delta smelt, Central Valley steelhead DPS, Sacramento River winter-run or Central Valley spring-run Chinook salmon ESUs, or green sturgeon (Table 7-1).

Table 7-1.
Federally Listed Aquatic Species That May be Affected by the WY 2010 Interim Flows

Species	Federal Status	Critical Habitat	Conclusion
Central Valley steelhead *Oncorhynchus mykiss*	T	Designated critical habitat in action area (70 *Federal Register* 52488, September 2, 2005).	Not likely to adversely affect species or adversely modify critical habitat.
Sacramento River winter-run Chinook salmon *Oncorhynchus tshawytscha*	E	Designated critical habitat not in action area (58 *Federal Register* 33212, June 16, 1993).	Not likely to adversely affect species or adversely modify critical habitat.
Central Valley spring-run Chinook salmon *Oncorhynchus tshawytscha*	T	Designated critical habitat not in action area (70 *Federal Register* 52488, September 2, 2005).	Not likely to adversely affect species or adversely modify critical habitat.
Delta smelt *Hypomesus transpacificus*	T	Designated critical habitat in action area (70 *Federal Register* 46924–46999).	Not likely to adversely affect species or adversely modify critical habitat.
Southern DPS of the North American Green Sturgeon *Acipenser medirostris*	T	No designated critical habitat.	Not likely to adversely affect species.

Note:
Federal Listing Categories:
E = Federally listed as endangered.
T = Federally listed as threatened.

7.2 Terrestrial Species

The Proposed Action is not likely to adversely affect any federally listed plant or animal species or designated critical habitat (Table 7-2). Because WY 2010 Interim Flows would be confined within the existing channel, would not increase flood flow levels, would last for only a single year, and would fall within the range of and be timed to be similar to historical flows, implementation of Interim Flows in WY 2010 would not result in adverse changes in conditions affecting listed species or their habitats along the San Joaquin River or Eastside or Mariposa bypasses during their release or later in time. In addition, the WY 2010 Interim Flows would not have adverse direct or indirect effects on listed species in the Merced, Stanislaus, or Tuolumne rivers, or the Delta because the flows would also be within the normal range and be timed to be similar to historic flows and would be confined to the existing channel.

Table 7-2.
Federally Terrestrial Species That May be Affected by the SJRRP WY 2010 Flows

Species	Federal Status	Critical Habitat	Conclusion
Succulent owl's-clover *Castilleja campestris* ssp. *succulenta*	T	Designated critical habitat in action area (70 *Federal Register* 46924–46999).	Not likely to adversely affect species or adversely modify critical habitat.
Hoover's spurge *Chamaesyce hooveri*	T	Designated critical habitat in action area (70 *Federal Register* 46924–46999).	Not likely to adversely affect species or adversely modify critical habitat.
Palmate-bracted bird's-beak *Cordylanthus palmatus*	E	None designated.	Not likely to adversely affect species.
Colusa grass *Neostapfia colusana*	T	Designated critical habitat in action area (70 *Federal Register* 46924–46999).	Not likely to adversely affect species or adversely modify critical habitat.
San Joaquin Valley Orcutt grass *Orcuttia inaequalis*	T	Designated critical habitat adjacent to action area (70 *Federal Register* 46924–46999).	Not likely to adversely affect species or adversely modify critical habitat.
Hairy Orcutt grass *Orcuttia pilosa*	E	Designated critical habitat in action area (70 *Federal Register* 46924–46999).	Not likely to adversely affect species or adversely modify critical habitat.
Greene's tuctoria *Tuctoria greenei*	E	Designated critical habitat in action area (70 *Federal Register* 46924–46999).	Not likely to adversely affect species or adversely modify critical habitat.
Conservancy fairy shrimp *Branchinecta conservatio*	E	Designated critical habitat in action area (70 *Federal Register* 46924–46999).	Not likely to adversely affect species or adversely modify critical habitat.
Longhorn fairy shrimp *Branchinecta longiantenna*	E	Designated critical habitat in action area (70 *Federal Register* 46924–46999).	Not likely to adversely affect species or adversely modify critical habitat.
Vernal pool fairy shrimp *Branchinecta lynchi*	T	Designated critical habitat in action area (70 *Federal Register* 46924–46999).	Not likely to adversely affect species or adversely modify critical habitat.
Vernal pool tadpole shrimp *Lepidurus packardi*	E	Designated critical habitat in action area (70 *Federal Register* 46924–46999).	Not likely to adversely affect species or adversely modify critical habitat.

Table 7-2.
Federally Terrestrial Species That May be Affected by the SJRRP WY 2010 Flows (contd.)

Species	Federal Status	Critical Habitat	Conclusion
Valley elderberry longhorn beetle *Desmocerus californicus dimorphus*	T	No designated critical habitat in action area (45 *Federal Register* 52803–52807).	Not likely to adversely affect species or adversely modify critical habitat.
California tiger salamander *Ambystoma californiense*	T	Designated critical habitat in action area (70 *Federal Register* 49379-49458).	Not likely to adversely affect species or adversely modify critical habitat.
Blunt-nosed leopard lizard *Gambelia sila*	E	None designated.	Not likely to adversely affect species.
Giant garter snake *Thamnophis gigas*	T	None designated.	Not likely to adversely affect species.
Western yellow-billed cuckoo *Coccyzus americanus occidentalis*	C	None designated.	Not likely to adversely affect species.
Least Bell's vireo *Vireo bellii pusillus*	E	No designated critical habitat in action area (59 *Federal Register* 4845- 4867).	Not likely to adversely affect species or adversely modify critical habitat.
Riparian brush rabbit *Sylvilagus bachmani riparius*	E	None designated.	Not likely to adversely affect species.
Fresno kangaroo rat *Dipodomys nitratoides exilis*	E	No designated critical habitat in action area (50 *Federal Register* 4222–4226).	Not likely to adversely affect species or adversely modify critical habitat.
San Joaquin (riparian) woodrat *Neotoma fuscipes riparia*	E	None designated.	Not likely to adversely affect species.
San Joaquin kit fox *Vulpes macrotis mutica*	E	None designated.	Not likely to adversely affect species.

Source: USFWS 2009

Notes:
U.S. Fish and Wildlife Service (USFWS) Federal Listing Categories:
C = Candidate for listing
E = Federally listed as endangered
T = Federally listed as threatened

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SAN JOAQUIN RIVER
RESTORATION PROGRAM

United States Department of the Interior

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MAY 22 2009

MEMORANDUM

To: Field Supervisor
Attention: Susan Moore
U.S. Fish and Wildlife Service

From: Jason Philips
Program Manager
San Joaquin River Restoration Program

Subject: Section 7 Endangered Species Act Consultation and Request for Concurrence with Determination of May Affect But is Not Likely to Adversely Affect for San Joaquin River Restoration Program's Water Year 2010 Interim Flows Project

Pursuant to Section 7 of the Endangered Species Act (ESA) (16 U.S.C. §1536(c)), the Bureau of Reclamation (Reclamation) requests initiation of consultation on the proposed Water Year (WY) 2010 Interim Flows Project (Proposed Action).

Reclamation is proposing to temporarily change Friant Dam operations in WY 2010 (October 1, 2009, through September 30, 2010,) to release Interim Flows as specified in the Stipulation of Settlement (Settlement) in NRDC, et al. v. Kirk Rodgers, et al. The Interim Flows would be conveyed down the San Joaquin River channel and potentially, down the Eastside and Mariposa bypasses, to the Sacramento-San Joaquin River Delta (Delta). Under the Proposed Action, WY 2010 Interim Flows would be recaptured by existing water diversion facilities along the San Joaquin River and/or in the Delta for agricultural, municipal and industrial, or fish and wildlife uses, to the extent possible. Potential diversion locations for recapturing WY 2010 Interim Flow releases are Mendota Pool, Arroyo Canal, the Lone Tree Unit of the Merced National Wildlife Refuge (NWR), the East Bear Creek Unit of the San Luis NWR, and Central Valley Project and State Water Project Delta export facilities. The Proposed Action also includes the implementation of environmental commitments to avoid impacts to special-status species, a vehicular traffic detour plan, a recreation outreach program, and the implementation of a groundwater seepage management and monitoring plan.

The purpose of the Proposed Action is to implement the provisions of the Settlement related to the release of Interim Flows for WY 2010. As described in the Settlement, the purpose of the Interim Flows is to collect relevant data concerning flows, temperatures, fish needs, seepage losses, recirculation, and recapture and reuse of Interim Flows and Restoration Flows under the SJRRP. The SJRRP Implementing Agencies, which include Reclamation, the U.S. Fish and Wildlife

Service, the National Marine Fisheries Service, the California Department of Water Resources, and the California Department of Fish and Game, will conduct a variety of monitoring and study actions for the WY 2010 Interim Flow release period.

The enclosed biological assessment (BA) analyzes the potential effects of the Proposed WY 2010 Interim Flows Project in accordance with the legal requirements set forth under Section 7 of the ESA. A species list for the potentially affected area was generated on May 6, 2009, from the Sacramento Fish and Wildlife Office website. Of these species, Reclamation has determined that the Proposed Action has the potential to affect the following species:

Blunt-nosed leopard lizard *Gambelia sila*
California tiger salamander *Ambystoma californiense* and critical habitat
Conservancy fairy shrimp *Branchinecta conservation* and critical habitat
Colusa grass *Neostapfia colusana* and critical habitat
Delta smelt *Hypomesus transpacificus*
Fresno kangaroo rat *Dipodomys nitratoides exilis*
Giant garter snake *Thamnophis gigas*
Greene's tuctoria *Tuctoria greenei* and critical habitat
Hairy Orcutt grass *Orcuttia pilosa* and critical habitat
Hoover's spurge *Chamaesyce hooveri* and critical habitat
Least Bell's vireo *Vireo bellii pusillus*
Longhorn fairy shrimp *Branchinecta longiantenna* and critical habitat
Palmate-bracted bird's-beak *Cordylanthus palmatus*
Riparian brush rabbit *Sylvilagus bachmani riparius*
San Joaquin kit fox *Vulpes macrotis mutica*
San Joaquin Valley Orcutt grass *Orcuttia inaequalis* and critical habitat
San Joaquin (riparian) woodrat *Neotoma fuscipes riparia*
Succulent owl's-clover *Castilleja campestris* ssp. *succulenta* and critical habitat
Valley elderberry longhorn beetle *Desmocerus californicus dimorphus*
Vernal pool fairy shrimp *Branchinecta lynchi* and critical habitat
Vernal pool tadpole shrimp *Lepidurus packardi* and critical habitat
Western yellow-billed cuckoo*Coccyzus americanus occidentalis*

Under the Proposed Action, the flows proposed are constrained by channel capacity and the need to avoid and minimize seepage concerns to neighboring landowners. The flows associated with the Proposed Action are within the current and historical range of flood flows that currently occurs in the project area and within the compliance of Reclamation's 2008 Operations of the Central Valley Project and State Water Project biological opinion dated December 15, 2008. Therefore, effects to delta smelt are covered by that biological opinion and Reclamation has determined that implementation of the Proposed Action may affect, but is not likely to adversely affect, all the other species and critical habitat listed above. However, the Proposed Action includes avoidance and minimization measures and a monitoring strategy, as described in the BA, to minimize the potential effects of the Proposed Action.

Reclamation would appreciate your written concurrence within 30 days of receipt of this letter. Please contact Mr. Brad Hubbard, Natural Resources Specialist, at (916) 978-5457 if you have any questions. Thank you for your ongoing support and assistance with the SJRRP.

Sincerely,

Jason R. Phillips
Program Manager

Enclosures: 2

cc: Maria Rae
National Marine Fisheries Service
650 Capital Mall, Suite 6070
Sacramento, CA 95814

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United States Department of the Interior

BUREAU OF RECLAMATION
Mid-Pacific Regional Office
2800 Cottage Way
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TAKE PRIDE IN AMERICA

IN REPLY REFER TO:
MP-170
ENV-7.00

MAY 22 2009

Mr. Russ Strach
National Marine Fisheries Service
Sacramento Area Office
650 Capital Mall, Suite 6070
Sacramento, CA 95814

Subject: Section 7 Endangered Species Act Consultation and Request for Concurrence with Determination of May Affect But is Not Likely to Adversely Affect for San Joaquin River Restoration Program's Water Year 2010 Interim Flows Project

Dear Mr. McInnis:

The Bureau of Reclamation (Reclamation) is submitting the enclosed Biological Assessment (BA) to the National Marine Fisheries Service (NMFS) for the San Joaquin River Restoration Program's (SJRRP) Water Year (WY) 2010 Interim Flows Project (Proposed Action). Reclamation requests initiation of Section 7 Endangered Species Act consultation and requests for concurrence with our determination of may affect, but is not likely to adversely affect.

Reclamation is proposing to temporarily change Friant Dam operations in WY 2010 (October 1, 2009, through September 30, 2010) to release Interim Flows as specified in the Stipulation of Settlement (Settlement) in NRDC, et al. v. Kirk Rodgers, et al. The Interim Flows would be conveyed down the San Joaquin River channel and potentially, down the Eastside and Mariposa bypasses, to the Sacramento-San Joaquin River Delta (Delta). Under the Proposed Action, WY 2010 Interim Flows would be recaptured by existing water diversion facilities along the San Joaquin River and/or in the Delta for agricultural, municipal and industrial, or fish and wildlife uses, to the extent possible. Potential diversion locations for recapturing WY 2010 Interim Flow releases are Mendota Pool, Arroyo Canal, the Lone Tree Unit of the Merced National Wildlife Refuge (NWR), the East Bear Creek Unit of the San Luis NWR, and Central Valley Project and State Water Project Delta export facilities. The Proposed Action also includes the implementation of environmental commitments to avoid impacts to special-status species, a vehicular traffic detour plan, a recreation outreach program, and the implementation of a groundwater seepage management and monitoring plan.

The purpose of the Proposed Action is to implement the provisions of the Settlement related to the release of Interim Flows for WY 2010. As described in the Settlement, the purpose of the Interim Flows is to collect relevant data concerning flows, temperatures, fish needs, seepage losses, recirculation, and recapture and reuse of Interim Flows and Restoration Flows under the

SJRRP. The SJRRP Implementing Agencies, which include Reclamation, the U.S. Fish and Wildlife Service, NMFS, the California Department of Water Resources, and the California Department of Fish and Game, will conduct a variety of monitoring and study actions for the WY 2010 Interim Flow release period.

This letter, and the attached BA, serves as initiation of consultation for the Proposed Action. Releasing the WY 2010 Interim Flows will provide crucial information necessary to assist with implementing the Settlement's long-term goal of restoring and maintaining fish populations in "good condition" in the main stem San Joaquin River, including naturally reproducing and self-sustaining populations of salmon and other fish. Due to the short-term nature of the Proposed Action and the small magnitude of effects anticipated, Reclamation has determined that the Proposed Action may affect, but is not likely to adversely affect, the Central Valley steelhead Distinct Population Segment (DPS), Sacramento River winter-run Chinook salmon Evolutionary Significant Unit (ESU), Central Valley spring-run Chinook salmon ESU, Southern DPS of North American green sturgeon, or their respective designated and proposed critical habitats. In addition, Reclamation has determined that the Proposed Action may affect, but is not likely to adversely affect, Essential Fish Habitat for Pacific salmon or starry flounder.

Reclamation would appreciate your written concurrence within 30 days of receipt of this letter. Please contact Mr. Brad Hubbard, Natural Resources Specialist, at (916) 978-5457 if you have any questions. Thank you for your ongoing support and assistance with the SJRRP.

Sincerely,

Jason Phillips
Program Manager

Enclosures: 2

cc: Maria Rae
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Continued on next page.

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United States Department of the Interior

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2800 Cottage Way, Room W-2605
Sacramento, California 95825-1846

In reply refer to:
81420-2009-I-0805

JUL 15 2009

Memorandum

To: Program Manager, San Joaquin River Restoration Program, U.S. Bureau of Reclamation, Sacramento, California

From: Assistant Field Supervisor, Sacramento Fish and Wildlife Office, Sacramento, California

Subject: Concurrence on the San Joaquin River Restoration Program's Water Year 2010 Interim Flows Project in Kern, Kings, Mariposa, Stanislaus, San Joaquin, Alameda, Contra Costa, Fresno, Madera and Merced Counties, California

This memorandum is in response to your May 22, 2009, memorandum requesting concurrence with your determination that your above-referenced project may affect, but is not likely to adversely affect the following federally-listed species or adversely modify the following critical habitats: California tiger salamander (*Ambystoma californiense)* and critical habitat, blunt-nosed leopard lizard *(Gambelia sila*), conservancy fairy shrimp *(Branchinecta conservation)* and critical habitat, colusa grass (*Neostapfia colusana)* and critical habitat, delta smelt (*Hypomesus transpacificus)* and critical habitat, Fresno kangaroo rat *(Dipodomys nitratoides exilis),* giant garter snake *(Thamnophis gigas),* Greene's tuctoria (*Tuctoria greenei)* and critical habitat, hairy orcutt grass (*Orcuttia pilosa)* and critical habitat, Hoover's spurge (*Chamaesyce hooveri)* and critical habitat, Least Bell's vireo (*Vireo bellii pusillus),* longhorn fairy shrimp *(Branchinecta longiantenna)* and critical habitat, palmate-bracted bird's-beak (*Cordylanthus palmatus),* riparian brush rabbit *(Sylvilagus bachmani riparius),* San Joaquin kit fox (*Vulpes macrotis mutica),* San Joaquin Valley Orcutt grass (*Orcuttia inaequalis)* and critical habitat, San Joaquin (riparian) woodrat *(Neotoma fuscipes riparia),* succulent owl's-clover (*Castilleja campestris* ssp. *succulenta)* and critical habitat, vernal pool fairy shrimp *(Branchinecta lynchi)* and critical habitat, vernal pool tadpole shrimp *(Lepidurus packardi)* and critical habitat, western yellow-billed cuckoo (*Coccyzus americanus occidentalis),* and valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*). Your request was received by the Service on May 26, 2009. Our primary concern and mandate is the protection of federally-listed species pursuant to the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq*.) (Act).

We have reviewed the proposed project, including: (1) the U.S. Bureau of Reclamation's (Reclamation) May 22, 2009, memorandum requesting concurrence with a may affect, but not likely to adversely affect determination for the above-referenced species and critical habitat; (2) Reclamation's Biological Assessment for the Water Year 2010 Interim Flows Project (proposed project) dated May 22, 2009; (3) the May 1, 2007 *San Joaquin River Restoration Program Implementing the Stipulation of Settlement in Natural Resources Defense Council, et al., v. Kirk Rodgers, United States Bureau of Reclamation, et al.*, Program Management Plan (Settlement); (4) the draft Environmental Assessment and Finding of No Significant Impact/Initial Study and Mitigated Negative Declaration for Water Year 2010 Interim Flows Project dated June 2009; (5) electronic mail correspondence, discussions and meetings between Stephanie Rickabaugh with the U.S. Fish and Wildlife Service (Service) and Brad Hubbard with Reclamation clarifying avoidance measures and proposed project details through the biweekly Environmental Compliance and Permitting Working Group; and (6) other information available to the Service. The Service is an Implementing Agency in this San Joaquin River Restoration Program and has been working closely with Reclamation since early 2008 on the project planning and recommendations for avoidance and minimization measures for federally-listed species.

The proposed project, as described, is to increase the release of water from Friant Dam during two separate time frames, for one year (WY2010) in accordance with the Settlement and in a manner consistent with Federal, State, and local laws, and future agreements with downstream agencies, entities, and landowners. These releases would allow data to be collected to better evaluate flows, temperature, fish needs, biological effects and seepage losses, and water recirculation, recapture, and reuse opportunities. The proposed project would release Interim Flows to the San Joaquin River from Friant Dam during WY 2010, from October 1, 2009, through November 20, 2009 (first release) and from February 1, 2010, through September 30, 2010 (second release), in accordance with the flow schedule presented in Exhibit B of the Settlement. No releases specific to the proposed project would occur between November 21, 2009 and January 31, 2010. WY 2010 Interim Flows would be reduced or diverted as needed to avoid causing substantial adverse conditions in downstream reaches, as specified in the Environmental Commitments, Chapter 3 of the Biological Assessment. The proposed action also involves the potential for recapture of WY 2010 Interim Flows at specified locations along the San Joaquin River, in the Delta, or both to the maximum extent possible, and transferring this water back to the Friant Division Long-Term Contractors. The maximum downstream extent of WY2010 Interim Flows that could be recaptured would be at the CVP Harvey O. Banks Pumping Plant and the SWP C.W. "Bill" Jones Pumping Plant in the Delta.

Reclamation is currently conducting surveys for blunt-nosed leopard lizards within the proposed project. Because these surveys are currently on-going and will continue through the summer of 2009, we currently have insufficient information to make a decision regarding concurrence on any effects to this species until we have reviewed your survey report.

The maximum flow releases out of Friant Dam for the first and second releases is proposed to be 700 cfs and 1660 cfs, respectively. The proposed project flows are constrained by existing channel capacity of Reach 2B, which was determined to be 1,300 cfs. Data collected during the 1999, pilot flows determined seepage rates for these upper reaches which are the bases for the seepage data discussed in the Settlement. Additionally, the Settlement includes in the Interim Flows, the water releases required for existing water right holders (i.e. riparian releases). Therefore the initial release of 1,660 cfs from Friant Dam would be reduced by at least 360 cfs due to seepage and the required water contractors in the upper reaches, prior to reaching Reach 2B. Because the purpose of the proposed project is to collect data and the proposed project flows are equivalent, or less than current and historic flood flows that occurred in the channel, the Service concurs with your determination that the proposed project, as described may affect, but is not likely to adversely affect the above-referenced list of federally-listed species, with the exception of blunt-nosed leopard lizard, nor adversely modify the above-referenced list of designated critical habitats.

This memo does not conclude the Service's review of the San Joaquin River Restoration Program's Water Year 2010 Interim Flows Project because further coordination with the Service under the Act is necessary for blunt-nosed leopard lizard. Please note that this memorandum does not authorize take of listed species or adverse modification of designated critical habitat. This memorandum is provided specific to this action area, and for the proposed project action only as originally described within the request. Any change in the proposed project, as described, will result in withdrawal of this concurrence. Section 9 of the Act prohibits the "take" (e.g., harm, harass, pursue, injure, kill) of federally-listed wildlife species. If any take occurs during the implementation of the activities described for this proposed project, those activities must be discontinued and the Service contacted immediately.

If you have any questions regarding the proposed San Joaquin River Restoration Program's Water Year 2010 Interim Flows Project, please contact Stephanie Rickabaugh or Susan Jones, Chief, San Joaquin Valley Branch at (916) 414-6600. We look forward to coordinating further with you on this project.

cc:
Brad Hubbard, Reclamation, Sacramento, California
Leslie Mirise, National Marine Fisheries Service, Sacramento, California
Kevin Faulkenberry, Department of Water Resources, Fresno, California
John Battistoni, Department of Fish and Game, Fresno, California

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Sacramento Fish and Wildlife Office
2800 Cottage Way, Room W-2605
Sacramento, California 95825-1846

In Reply Refer To:
81420-2009-I-0805-1

SEP 24 2009

Memorandum

To: Program Manager, San Joaquin River Restoration Program, U.S. Bureau of Reclamation, Sacramento, California

From: Peter A. Gross
Act Assistant Field Supervisor,
Sacramento Fish and Wildlife Office, Sacramento, California

Subject: Concurrence for Blunt-Nosed Leopard Lizard San Joaquin River Restoration Program's Water Year 2010 Interim Flows Project Kern, Kings, Mariposa, Stanislaus, San Joaquin, Alameda, Contra Costa, Fresno, Madera, and Merced Counties, California

This memorandum supplements a memorandum sent on July 15, 2009, from the U.S. Fish and Wildlife Service (Service) to Jason Phillips, Program Manager for the U.S. Bureau of Reclamation's (Reclamation) San Joaquin River Restoration Program. In that memorandum (provided as Attachment A), the Service issued concurrence on may affect, but not likely to adversely affect determinations for the following federally-listed species:

- California tiger salamander (*Ambystoma coliforniense*) and critical habitat
- Conservancy fairy shrimp (*Branchinecta conservation*) and critical habitat
- Colusa grass (*Neostapfia colusana*) and critical habitat
- Delta smelt (*Hypomesus transpacificus*) and critical habitat
- Fresno kangaroo rat (*Dipodomys nitratoides exilis*)
- Hairy orcutt grass (*Orcuttia pilosa*) and critical habitat
- Giant garter snake (*Thamnophis gigas*)
- Greenes tuctoria (*Tuctoria greenei*) and critical habitat
- Hoover's spurge (*Chamaesyce hooveri*) and critical habitat
- Least Bell's vireo (*Vireo bellii pusillus*)
- Longhorn fairy shrimp (*Branchinecta longiantenna*) and critical habitat
- Palmate-bracted bird's-beak (*Cordylanthus palmatus*)
- Riparian brush rabbit (*Sylvilagus bachmani riparius*)
- San Joaquin kit fox (*Vulpes macrotis mutica*

- San Joaquin Valley Orcutt grass (*Orcuttia inaequalis*) and critical habitat
- San Joaquin (riparian) woodrat (*Neotoma fuscipes riparia*)
- Succulent owl's clover (*Castilleja campestris* spp. *succulenta*) and critical habitat
- Vernal pool fairy shrimp (*Branchinecta lynchi*) and critical habitat
- Vernal pool tadpole shrimp (*Lepidurus packardi*) and critical habitat
- Western yellow-billed cuckoo (*Coccyzus americanus occidentalis*)
- Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*)

The July 15, 2009 memorandum went on to identify that concurrence for blunt-nosed leopard lizard (BNLL) (*Gambelia sila*) would not be completed until sufficient information was provided from surveys that were being conducted along the project limits and the Service had reviewed the subsequent survey report (provided as Attachment B). Adult surveys were conducted through California State University (CSU), Stanislaus' Endangered Species Recovery Program and were completed in July 2009. Juvenile surveys were completed in September 2009. Overall, site conditions were ranked utilizing a habitat suitability index, from 1 being the least suitable for BNLLs to 10 being the most suitable. Properties within the survey area were generally ranked between 2 and 6 for habitat suitability. Twenty-eight of the 61 properties surveyed scored higher than a 5. The report summarizes that the overall low to moderate habitat values along the corridor are generally not conducive to the occurrence of BNLLs. It was also noted by CSU observers that there was a surprising lack of reptile sightings, with only 14 sightings of various common reptiles throughout 53 days of surveys, with 3 surveyors per day.

The majority of property owners along the Eastside Bypass (bypass) granted access to their lands for surveys through temporary entry permits (TEPs). A limiting factor of the analysis is that not all property owners along the bypass signed TEPs for studies on their property. However, based on all appropriate available data and by reasonably applying information from known site conditions and land use on neighboring surveyed parcels, it can be extrapolated that the few remaining parcels adjacent to the bypass have similar habitat characteristics, with very low to moderate habitat suitability throughout. The flows from the action are also scheduled to stay within the existing low-flow channel, as evidenced in the Environmental Assessment/Initial Study and the Biological Assessment for the action. Existing conditions within the low-flow channel generally consist of inadequate habitat conditions for BNLL and are generally seasonally saturated or inundated by existing pools of water. Thus, it is a reasonable assessment that BNLLs will not be jeopardized by the release of Water Year (WY) 2010 interim flows. The lack of suitable habitat conditions along the bypass in combination with the fact that the WY2010 Interim Flows Project will stay within the existing low-flow channel, means that this action may affect, but is not likely to adversely affect BNLLs.

This memorandum satisfies Reclamation's request for consultation under Section 7(c) of the Endangered Species Act. Reclamation should continue to be aware of any change in status of species outlined in this document, and be prepared to reevaluate impacts of the proposed action, if necessary, during implementation of the project.

If you have any questions regarding the San Joaquin River Restoration Program's WY 2010 Interim Flows Project, please contact Mark Littlefield or Susan Jones, Chief, San Joaquin Valley Branch at (916) 414-6600.

cc:
John Battistoni, Department of Fish and Game, Fresno, California
Kevin Faulkenberry, Department of Water Resources, Fresno, California
Leslie Mirise, National Marine Fisheries Service, Sacramento, California
Michelle Banonis, Reclamation, Sacramento, California

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Region
501 West Ocean Boulevard, Suite 4200
Long Beach, California 90802-4213

SEP 23 2009

In response refer to:
2009/02837

Jason Phillips
Program Manager
U.S. Bureau of Reclamation
Mid-Pacific Regional Office
2800 Cottage Way
Sacramento, California 95825-1898

Dear Mr. Phillips:

This letter is in response to your May 22, 2009, letter requesting concurrence from NOAA's National Marine Fisheries Service (NMFS) that the proposed San Joaquin River Restoration Program's (SJRRP) Water Year (WY) 2010 Interim Flows Project (Proposed Action) may affect but is not likely to adversely affect threatened Central Valley (CV) steelhead (*Oncorhynchus mykiss*), endangered Sacramento River winter-run Chinook salmon (*O. tshawytscha*), threatened CV spring-run Chinook salmon (*O. tshawytscha*), the threatened Southern Distinct Population Segment (DPS) of North American green sturgeon,(*Acipenser medirostris*), or the designated critical habitat for the CV steelhead, in accordance with the Endangered Species Act (ESA). In addition, the Bureau of Reclamation (Reclamation) has determined that the proposed project may adversely affect the essential fish habitat (EFH) of Pacific salmon, and has requested initiation of consultation pursuant to the Magnuson-Stevens Fishery Conservation and Management Act (MSA). This letter also serves as consultation under the authority of and in accordance with the provisions of the Fish and Wildlife Coordination Act of 1934 (FWCA), as amended.

The SJRRP was established in late 2006 to implement the Stipulation of Settlement in *NRDC, et al. v. Kirk Rodgers et al.* (Settlement). Authorization for implementing the Settlement is provided in the San Joaquin River Restoration Settlement Act (Act: Public Law 111-11).

Reclamation is proposing to temporarily change Friant Dam operations in WY 2010 (October 1, 2009 through September 30, 2010) to accommodate the release of Interim Flows from Friant Dam into the San Joaquin River and potentially downstream as far as the Sacramento-San Joaquin Delta (Delta), as specified in the Act. Reoperation of Friant Dam is part of the SJRRP established under the Settlement. A portion or all of the

Interim Flows would be recaptured by existing water diversion facilities along the San Joaquin River and/or in the Delta for agricultural, municipal, and industrial, and/or fish and wildlife uses to the extent possible. Potential diversion locations for recapturing releases of Interim Flows during WY 2010 are Mendota Pool, Arroyo Canal, the Lone Tree Unit of the Merced National Wildlife Refuge (NWR), the East Bear Creek Unit of the San Luis NWR Complex, and Central Valley Project (CVP), and State Water Project (SWP) Delta Export facilities. The Proposed Action would involve no construction activities.

Consultation History

Informal consultations between Reclamation and NMFS on the Proposed Action have occurred regularly beginning February 19, 2009, primarily as part of the Environmental Compliance and Permitting Work Group (ECPWG), which includes staff from all Implementing Agencies, including Reclamation, U.S. Fish and Wildlife Service (USFWS), and NMFS. This group is also the focal point for the development of the Environmental Assessment/Initial Study (EA/IS) for the Proposed Action, to meet the requirements of the National Environmental Policy Act and the California Environmental Quality Act. In addition, members of the Fisheries Management Work Group (FMWG), which also includes staff from the Implementing Agencies, were involved in stages of the consultation process. Endangered Species Act (ESA) compliance for the WY 2010 Interim Flows, and the SJRRP as a whole, has been discussed on a regular basis as summarized in Table 2-1 in the SJRRP WY 2010 Interim Flows Project Biological Assessment (BA). The ECPWG and FMWG members continue to meet regularly, generally on a bi-weekly basis, to discuss ESA issues.

NMFS reviewed the information provided with your May 22, 2009, letter and found that it was insufficient to support a determination of not likely to adversely affect federally listed anadromous fish species or their designated critical habitat, and as a result we could not concur with that determination. Following the 30-day sufficiency review pursuant to 50 CFR 402.12(j), we provided a written response, dated June 30, 2009, in which we requested additional information deemed necessary to determine the level of effect from the Proposed Action on listed fish and their habitats, including effects to EFH. A meeting including Reclamation, their consultants MWH, USFWS, and NMFS occurred on July 15, 2009 to address concerns listed in NMFS' June 30, 2009, letter. Reclamation provided the requested additional information in two separate emails received by NMFS on July 27 and August 20, 2009. This supplemental information included details relevant to: 1) Flows in the Lower San Joaquin River and its tributaries, 2) temperature, 3) Delta flow patterns, 4) contaminants, and 5) effects of the Proposed Action on EFH. Two additional meetings between the same parties occurred on August 10 and 28, 2009, in order to discuss proposed changes to the EA/IS and identify any additional information requirements in order to complete the initiation package for consultation under the ESA. The proposed changes included modification of the project description to ensure that potentially adverse effects to ESA listed species within the action area would be minimized and avoided to the fullest extent practicable, as well as the addition of clarifying information to support Reclamation's analysis of effects related to the

Proposed Action. NMFS has received your letter dated September 17, 2009, which updates and amends the BA, and is in receipt of all the information necessary to initiate consultation. Subsequent reference herein to the BA includes the original document as updated and amended by the September 17, 2009 communication. This analysis is based on the September 2, 2009 project description provided in Chapter 2 of the EA/IS, all of the information provided during the consultation history, and the best scientific and commercial information currently available.

Action Area

The action area includes all areas where flows and water levels could be altered as a result of the release of WY 2010 Interim Flows under the SJRRP, and include the following: 1) Millerton Lake and the San Joaquin River between Kerkhoff Dam and Millerton Lake, 2) San Joaquin River from Friant Dam downstream to the Delta, 3) Eastside Bypass, downstream from the Sand Slough Control Structure, and the Mariposa Bypass, 4) Merced, Tuolumne, and Stanislaus rivers downstream from New Exchequer, Don Pedro, and New Melones dams, and 5) south and central Delta, defined as the San Joaquin River and its tributaries with the Delta west to its confluence with the Sacramento River.

Summary of Proposed Action

The Settlement stipulates the release of both Interim Flows and Restoration Flows. The release of Interim Flows is to begin October 1, 2009, and continue until full Restoration Flows begin. The purpose of the Interim Flows is to collect relevant data on flows, temperatures, fish needs, seepage losses, recirculation, recapture, and reuse.

The Proposed Action is the implementation of the Interim Flows for the single WY 2010. This will include the release and potential downstream recapture of Interim Flows, conveyance of flows in the San Joaquin River system to the Delta, and monitoring to be conducted during the Interim Flow releases. The Interim Flows for this initial year are expected to yield important information to inform the later implementation of a program of Interim Flows and Restoration Flows. WY 2010 Interim Flows would be released to the San Joaquin River from Friant Dam between October 1 and November 20, 2009, and from February 1 to September 30, 2010, in accordance with the flow schedule presented in Exhibit B of the Settlement. Estimated maximum non-flood flows for each reach of the San Joaquin River and conveyance facilities between Friant Dam and the confluence with the Merced River (Restoration Area) under the Proposed Action are included within the project BA by water year-type. The water year-type for WY 2010 cannot be determined until spring 2010.

At the maximum extent, WY 2010 Interim Flows released from Friant Dam would flow through the Restoration Area, combine with flows from major tributaries, and enter the Delta. However, these flows would be reduced or diverted as needed to avoid causing adverse conditions in the downstream reaches, for a variety of reasons including fishery concerns, channel capacity, and seepage issues as described in the BA.

The Proposed Action involves options for recapturing Interim Flows at locations along the San Joaquin River, in the Delta, or both to the maximum extent possible during WY 2010, and transferring water back to the Friant Division Long-Term Contractors. The farthest downstream that Interim Flows could be recaptured during WY 2010 would be at the Jones and Banks pumping plants in the south Delta. The Proposed Action includes several diversion locations where Interim Flows could be recaptured: 1) existing CVP and SWP facilities in the Delta, 2) the Mendota Pool at the downstream end of San Joaquin River Reach 2B, 3) the Arroyo Canal at the downstream end of San Joaquin River Reach 3, 4) The Lone Tree Unit of the Merced NWR (Lone Tree Unit) in Reach 2 of the Eastside Bypass, and 5) the East Bear Creek Unit of the San Luis NWR (East Bear Creek Unit) in Reach 3 of the East Side Bypass.

WY 2010 Interim Flows recaptured along the San Joaquin River may provide deliveries in lieu of Delta-Mendota Canal supplies. In this case, Delta exports would not change under the Proposed Action. An amount of exported water, up to an equivalent of the Interim Flows, could be available for recirculation to the Friant Division using south-of-Delta facilities. No additional agreements would be required to recapture flows in the Restoration Area. Mutual agreements between Reclamation, California Department of Water Resources, the Friant Division Long-Term Contractors, and other south-of-Delta CVP/SWP contractors could be required before recaptured water could be re-circulated to the Friant Division.

Implementation of the Proposed Action would result in a negligible increase in Delta inflow. It would also result in small changes to allowable Delta exports under existing operating criteria, consistent with prevailing and relevant laws, regulations, biological opinions, and court orders in force at the time the water is recaptured. Any additional Delta exports would be eligible for recirculation to the Friant Division.

Given the uncertainties associated with the WY 2010 Interim Flows, such as the water quality changes, the flow schedule, and Vernalis Adaptive Management Program (VAMP) operations, Reclamation will coordinate with NMFS to ensure that potential adverse effects to listed species will be minimized. This will be accomplished by providing and discussing weekly stream flow and water quality data summaries. When Interim Flows are going past the confluence of the Merced River, specific stream flow and water quality measurements including dissolved oxygen, water temperature, pH, turbidity, stream flow, and specific conductivity will be collected and reviewed from locations on the San Joaquin River just upstream and downstream from the confluence with the Merced River as well as in the Merced River itself. Measurements of additional constituents will become available every two to four weeks including selenium, ammonia, and boron, and will be reviewed as they become available. Sources of this data are identified in the Draft Monitoring Plan for Physical Parameters Technical Memorandum (TM) available at restorsjr.net, Surface Water Ambient Monitoring Program (SWAMP), and the Grassland Bypass Project. In the event that monitoring data indicates a potential for Interim Flows to cause effects that are greater than those anticipated in the BA and in consultation with NMFS, Reclamation will work with

NMFS to modify Interim Flow releases, upstream diversions of flow to avoid downstream impacts, or constraining flows to the upper San Joaquin River upstream of the confluence with the Merced River. This weekly coordination with NMFS and Reclamation's commitment to modify flows is a process included in the project description of the Proposed Action which will allow modification of the Interim Flows to ensure that the effects of the Proposed Action remain at levels that may affect but are not likely to adversely affect federally listed anadromous fish species.

Endangered Species Act Section 7 Consultation

In order for NMFS to consider a project as being not likely to adversely affect the listed species, the effects upon the listed species must be discountable, insignificant, or completely beneficial. **Beneficial effects** are contemporaneous positive effects without any adverse effects to the species. **Insignificant effects** relate to the size of the impact and should never reach the scale where take occurs. **Discountable effects** are those extremely unlikely to occur. Based on best judgment, a person would not: (1) be able to meaningfully measure, detect, or evaluate insignificant effects; or (2) expect discountable effects to occur.

The action area includes but also extends beyond the geographic boundaries of several ESA listed anadromous fish species. The species exposed to the effects of the Proposed Action vary within three distinct sub-areas within the action area. For clarity of our species analysis we have defined them as the Delta Area, the Tributary Area, and the Restoration Area. The Delta Area is the area downstream of the confluence of the Stanislaus and San Joaquin rivers that may be affected by operations of the CVP/SWP export facilities. This is within the range of the Sacramento River winter-run Chinook salmon and the CV spring-run Chinook salmon Evolutionarily Significant Units and the CV steelhead DPS and is within the range of the Southern DPS of North American green sturgeon. Available information indicates Sacramento River winter-run Chinook salmon, CV spring-run Chinook salmon, CV steelhead, and North American green sturgeon utilize this portion of the action area for migration and rearing purposes. This area also includes designated critical habitat for CV steelhead. The Tributary Area includes the area of the San Joaquin River between its confluence with the Stanislaus and Merced rivers. CV steelhead is the only ESA listed anadromous fish that occurs in the Tributary Area, having small populations in the Merced, Tuolumne, and Stanislaus rivers. Designated critical habitat for CV steelhead includes these tributaries and the main stem San Joaquin River from the Delta to the confluence with the Merced River. Available information indicates CV steelhead utilizes this portion of the San Joaquin River for migration and rearing, and the tributaries support all other fresh water primary constituent elements. The Restoration Area includes the reaches of the San Joaquin River upstream of the confluence with the Merced River. Although these reaches of the San Joaquin River are within the historical range of CV steelhead, present habitat conditions in these reaches generally have been unsuitable for CV steelhead owing to the condition of no flow or lack of flow occurring since the operation of Friant Dam and its conveyance canals. CV steelhead are rarely able to access this area except under currently unusual conditions of extended high flows. There is no designated critical habitat for anadromous fish species in the Restoration Area.

The potential adverse effects to listed salmonids and green sturgeon associated with the WY 2010 Interim Flows are expected to be insignificant or discountable due to the restricted duration of the Proposed Action to a single year and due to the incorporation of several avoidance and minimization measures into the project description. These measures are discussed below in relation to the specific sub-areas in which they will be applied.

The Restoration Area

The potential adverse effect of the Proposed Action on CV steelhead in the Restoration Area could be the attraction of CV steelhead above the confluence of the Merced River. Since the operation of Friant Dam and its conveyance canals, habitat conditions in the San Joaquin River are unsuitable for CV steelhead owing to flow limitations and passage barriers. NMFS concurs that the likelihood of CV steelhead moving into the Restoration Area as a result of WY 2010 Interim Flows is extremely low. The rare observations of individual adult CV steelhead above the confluence of the Merced River in recent record have only occurred during flood and extended high release conditions (*e.g.*, 2,000-4,000 cubic feet per second for several continuous months) that have occurred in wet year conditions. The current depleted state of Millerton Reservoir would make such extended high flow conditions unlikely even in the event that Water Year 2010 is a wet year. Even in wet year conditions, the Interim Flows levels are not sufficient to re-create the conditions that have attracted CV steelhead up the San Joaquin River in recent years. Additionally, the California Department of Fish and Game (CDFG) will operate the Hills Ferry Barrier in fall and winter months to monitor and block adult anadromous fish, including CV steelhead, from migrating into the Restoration Area. Although the spring Interim Flows are unlikely to create environmental conditions attractive to CV steelhead in Water Year 2010, the project does include a monitoring and salvage component to redirect CV steelhead that might move into the Restoration Area. These activities are covered for take by other permitting mechanisms between NMFS and CDFG. Consequently, NMFS has determined that the potential for adverse effects to occur within the Restoration Area is expected to be reduced to an insignificant and discountable level.

The Tributary Area

If the WY 2010 Interim Flows reach the Tributary Area, they would have the potential to affect CV steelhead in terms of water temperature, potential introduction of contaminants, and potential reduction of spring flows in the tributaries by affecting the flows called for in the VAMP. Reclamation used various modeling tools to evaluate the likelihood and degree of such effects. The magnitudes of the modeled effects in these areas were not significant based on the conditions modeled, and the potential differences were within the expected range of error based on input data and assumptions, however, it is not feasible to model every potential condition that may occur. The modeled results did not indicate a significant potential change in temperature from baseline conditions, but the overarching trend in the temperature results was that Interim Flows that reach the confluence with the Merced River have the potential to raise water temperatures in the San Joaquin River. Through the informal consultation process, Reclamation identified that there are uncertainties associated with WY 2010 Interim Flows that flow beyond the confluence of the Merced River, such as the water quality changes, the flow schedule, as well as VAMP operations. Consequently, Reclamation has modified the project description to include weekly coordination with NMFS and a plan to modify Interim Flows to ensure that any potential effects to listed species will be minimized or avoided. In the event that monitoring of the Interim Flows shows a potential to cause effects that are greater than those anticipated in the BA, Reclamation has committed to work with NMFS to modify Interim Flow releases. Possible modifications include reducing flow releases, upstream diversions of flows to avoid downstream impacts, or constraining flows to the upper San Joaquin River upstream of the confluence with the Merced River. This weekly coordination with NMFS and Reclamation's commitment to modify flows based on real time conditions would ensure that the impacts of the WY 2010 Interim Flows would remain at levels that may affect but are not likely adversely affect listed species. Consequently, NMFS concurs that Reclamation's commitment to monitor temperatures and modify Interim Flows will ensure that the effect of the Proposed Action on water temperature below the confluence of the Merced River will be insignificant

The added volume from the Interim Flows could mobilize contaminants from within the channel that have accumulated in recent dry years. Although this effect is no different or less intense than the contaminant flushing that occurs with precipitation and flood events, contaminants could have effects on the aquatic food supply through the Delta suppressing growth rates and survival. The extent and effect of this potential stressor is unknown and cannot be determined at this time. The project description has been modified so that Reclamation commits to coordinate with NMFS and other agencies engaged in contaminant monitoring to monitor water quality components on a weekly to bi-weekly basis. Interim Flows will be modified if high levels of contaminants are detected to avoid conveyance downstream of the Merced River. NMFS concurs that the proposed monitoring program, combined with the commitment in the project description to reduce flow releases, to divert flows upstream to avoid downstream impacts, or to constrain flows to the upper San Joaquin River upstream of the confluence with the Merced River will ensure that potential effects of the Proposed Action will remain at an insignificant level.

The project description has been modified to include that Reclamation and NMFS will coordinate and monitor the VAMP tributary flow determination process, and will modify the Proposed Action to prevent Interim Flows from adversely modifying spring flow releases from tributaries. Modeling results in the BA also indicated that Interim Flow contributions can result in both increased or decreased spring tributary releases. The changes in flow as modeled are typically less than 12%, although some periods show a significant change on the Stanislaus River. Modeling of the VAMP flows was performed before the NMFS 2009 operations biological opinion was released. The reasonable and prudent alternative (RPA) actions for operational conditions for the Stanislaus River include minimum flows for salmonids and spring flow requirements. Implementation of

Action suite III of the RPA will provide instream protection for CV steelhead during WY 2010 Interim Flows. VAMP terms for 2010 are uncertain. NMFS concurs that Reclamation's commitment in the project description to monitor the development of the 2010 VAMP flow schedule and to operate the Interim Flows to not adversely affect spring tributary releases will reduce the effects of the Proposed Action to insignificant levels.

The inclusion of a monitoring and coordination process between Reclamation and NMFS in the project description, and the commitment to modify Interim Flows to avoid adverse effects will assure that potential adverse effects relating to water temperature, contaminants, and tributary flows will be reduced to an insignificant or discountable level in the Tributary Area.

The Delta Area

The NMFS 2009 biological opinion (Opinion) on the long-term operations of the CVP/SWP has analyzed the effects of proposed Delta export operations and provided a RPA for operations. Implementation of the RPA actions III and IV in particular will address potential effects of export operations relating to Interim Flows on Sacramento River winter-run Chinook salmon, CV spring-run Chinook salmon, CV steelhead, and the Southern DPS of North American green sturgeon. On June 4, 2009, Reclamation responded to this Opinion that Reclamation will begin immediate implementation of the RPA to comply with the Opinion, but they are also continuing to review the Opinion and RPA. NMFS concurs that the potential effects of the WY 2010 Interim Flows in the Delta Area will be reduced to an insignificant and discountable level, as long as the recapture of Friant Interim Flow water via the CVP/SWP export facilities is conducted under the Opinion and RPA.

NMFS concurs that the proposed WY 2010 Interim Flows project is not likely to adversely affect Sacramento River winter-run Chinook salmon, CV spring-run Chinook salmon, and CV steelhead and the designated critical habitat of CV steelhead, as well as the Southern DPS of North American green sturgeon. This concurrence is based on Reclamation implementing all conservation and protective measures intended to avoid or minimize adverse effects to fish and fish habitat as identified in the project description.

This concludes informal consultation for the proposed action. Reinitiation of consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered; (2) the action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered; or (3) a new species is listed or critical habitat designated that may be affected by the action.

Essential Fish Habitat (EFH) Consultation

Based on our review of the project description and conservation and protective measures included, NMFS finds that the project activities will not adversely affect EFH for Pacific salmon and starry flounder. We find the project activities incorporated in the project description include conservation measures that will reduce adverse affects to EFH for Pacific salmon, as described in Amendment 14 of the Pacific Salmon Fishery Management Plan pursuant to the MSA; therefore, additional EFH conservation recommendations will not be provided at this time. Written response as required under section 305(b)(4)(B) of the MSA and Federal regulations (50 CFR 600.920) will not be required. Should there be substantial revision to the Proposed Action, however, the lead Federal agency will need to re-initiate EFH consultation.

Fish and Wildlife Coordination Act (FWCA)

The purpose of the FWCA is to ensure that wildlife conservation receives equal consideration, and is coordinated with other aspects of water resources development (16 U.S.C. 661). The FWCA establishes a consultation requirement for federal departments and agencies that undertake any action that proposes to modify any stream or other body of water for any purpose, including navigation and drainage (16 U.S.C 662(a)). Consistent with this consultation requirement, NMFS provides recommendations and comments to Federal action agencies for the purpose of conserving fish and wildlife resources. The FWCA allows the opportunity to offer recommendations for the conservation of species and habitats beyond those currently managed under the ESA and MSA. Because the proposed project is designed to avoid environmental impacts to aquatic habitat within the action area, NMFS has no additional FWCA comments to provide.

If you have questions or need additional information regarding this response please contact Rhonda Reed at (916) 930-3609 or via email rhonda.reed@noaa.gov, or Erin Strange at (916) 930-3653 or via email erin.strange@noaa.gov.

Sincerely,

Maria Rea

for Rodney R. McInnis
Regional Administrator

cc: Copy to File – ARN 151422SWR2009SA00275
NMFS-PRD, Long Beach, CA

Attachment 10:

Streamflow and Water Quality

Coordination Calls

San Joaquin River Restoration Program
Weekly Interim Flows 2010, Stream Flow and Water Quality Monitoring Update

Meeting Minutes

October 8, 2009
12:30 p.m. – 1:00 p.m.
Conference Call
Call-In Number (877)718-7057, Pass Code 8098142

Invitees:

- ☒ TJ Kopshy, SWCB
- ☒ Jeff McLain, USFWS
- ☒ Carolyn Yale, EPA
- ☒ Doug DeFlitch, Reclamation
- ☒ Erin Rice, Reclamation
- ☒ Chris Eacock, Reclamation
- ☐ Rhonda Reed, NMFS
- ☐ Gerald Hatler, DFG
- ☐ Erin Strange, NMFS
- ☐ Michelle Workman, USFWS
- ☐ Kim Webb, USFWS
- ☒ Ernie Taylor, DWR
- ☒ Elif Fehm-Sullivan, NMFS
- ☒ Leslie Mirise, NMFS
- ☒ Dave Encinas, DWR
- ☒ Abimael Leon-Cardona, DWR
- ☒ Stephen Lee, Reclamation
- ☒ Michelle Banonis, Reclamation
- ☐ John Battistoni, DFG
- ☐ Karen Dulik, DWR
- ☐ Roger Guinee, USFWS
- ☐ Iris Yamagata, DWR
- ☐ Ali Gasdick, Reclamation

- Doug DeFlitch e-mailed out river's end documentation today. On October 1, 2009, flows were released from Friant Dam at 350 cfs.
- Prior to releases, there was about 5 cfs at Gravelly Ford. As of today, there is about 107 cfs at Gravelly Ford. At the Highway 99 gauge, there is about 207 cfs, and about 194 cfs at Skaggs Bridge.
- The levels at Skaggs Bridge are assumed to be stable.
- Stephen Lee reported that the river is progressing a little less than ½ mile per day.
- The depth to existing groundwater is approximately 75 feet below ground surface. Therefore, it will take some time for the pore space to fill as the river advances and widens, and groundwater tables start to replenish.
- Chris Eacock reported that water quality tests for approximately 60 miles of river are currently being taken and that it requires 12 bottles of water per site, 3 of which need to be shipped for analysis within 24 hours.
- Two complete runs of tests have been completed for sampling points upstream of Mendota. No results are available yet from the lab, but Chris will send the results to the group once they are obtained and verified.
- Hills Ferry, Mendota, and Sack Dam will be sampled next week.
- Chris is getting samples of water quality at all sites prior to flows reaching the site.

- After all the initial tests are completed, samples will be regularly taken each week on Tuesdays.
- Dave Encinas reported that DWR is working to complete gauge at the Sack Dam location.
- DWR reported that sediment surveys are to start in the next week and a half.
- Michelle to send real-time gauge web link to group.
- In the next week, it is predicted that there will be a slow migration of the river through Reach 2A and as the groundwater table starts to replenish.
- Next conference call will be October 15th at 12:30 p.m.

San Joaquin River Restoration Program
Weekly Interim Flows 2010, Stream Flow and Water Quality Monitoring Update

Meeting Minutes

October 15, 2009
12:30 p.m. – 1:00 p.m.
Conference Call
Call-In Number (877)718-7057, Pass Code 8098142

Invitees:

- ☒ TJ Kopshy, SWCB
- ☐ Jeff McLain, USFWS
- ☒ Carolyn Yale, EPA
- ☒ Doug DeFlitch, Reclamation
- ☒ Erin Rice, Reclamation
- ☐ Chris Eacock, Reclamation
- ☐ Rhonda Reed, NMFS
- ☒ Gerald Hatler, DFG
- ☐ Erin Strange, NMFS
- ☐ Michelle Workman, USFWS
- ☐ Kim Webb, USFWS
- ☒ Ernie Taylor, DWR
- ☒ Elif Fehm-Sullivan, NMFS
- ☒ Leslie Mirise, NMFS
- ☐ Dave Encinas, DWR
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- ☐ Stephen Lee, Reclamation
- ☐ Michelle Banonis, Reclamation
- ☐ John Battistoni, DFG
- ☐ Karen Dulik, DWR
- ☐ Roger Guinee, USFWS
- ☐ Iris Yamagata, DWR
- ☐ Ali Gasdick, Reclamation
- ☒ Shannon Brewer, DFG

- Following the storm, flows increased at Gravelly Ford from 130 to approximately 200 cfs, possibly due to reduced pumping by riparian users, increases from the large rain event, or other as-yet unknown reasons.Although they were not observed, it is possible that spills from Fresno/ Madera IDs contributed to the flow
- Doug Deflitch will be inspecting the gauging equipment today (10/15)
- We have not yet seen water quality results from the first sampling period. Chris Eacock will inform the team as soon as results become available.
- The flow is still advancing at approximately ½ mile per day and is between Gravelly Ford and the bifurcation structure
- Gerald Hatler reports that no in-stream temperature sensors have been lost, but some equipment was stolen from the gravel pits. Will be working to redeploy sensors to the gravel pits, make necessary corrections to data from equipment affected by the low pressure system, and pass information to the group as soon as possible.
- DFG will be conducting more site-specific transects and will be coordinating with Reclamation.

San Joaquin River Restoration Program
Weekly Interim Flows 2010, Stream Flow and Water Quality Monitoring Update

Meeting Minutes

October 22, 2009
12:30 p.m. – 1:00 p.m.
Conference Call
Call-In Number (877)718-7057, Pass Code 8098142

Invitees:

- ☒ TJ Kopshy, SWCB
- ☐ Jeff McLain, USFWS
- ☒ Carolyn Yale, EPA
- ☒ Doug DeFlitch, Reclamation
- ☒ Erin Rice, Reclamation
- ☒ Chris Eacock, Reclamation
- ☐ Rhonda Reed, NMFS
- ☐ Gerald Hatler, DFG
- ☐ Erin Strange, NMFS
- ☐ Michelle Workman, USFWS
- ☐ Kim Webb, USFWS
- ☒ Ernie Taylor, DWR
- ☐ Elif Fehm-Sullivan, NMFS
- ☐ Leslie Mirise, NMFS
- ☐ Dave Encinas, DWR
- ☐ Abimael Leon-Cardona, DWR
- ☒ Stephen Lee, Reclamation
- ☒ Michelle Banonis, Reclamation
- ☐ John Battistoni, DFG
- ☐ Karen Dulik, DWR
- ☐ Roger Guinee, USFWS
- ☐ Iris Yamagata, DWR
- ☐ Ali Gasdick, Reclamation

- The River's end is currently at river mile 221 (Reach 2) and is progressing at <1/2 mile/day.
- Lateral groundwater flow in Reach 2
- Seepage is still progressing at the max rate in Reach 2 as it has not yet reached the regional GW level.
- Shallow well levels rising at Shields (RM 223.8) and Napa (RM 222)
- Depths from land surface to water in the shallow monitor wells range from 16-24 feet near the river
- Although River stage is still rising at Shields, seepage is not slowing down yet; surface flows are still coming downstream
- Over 300 samples have been taken between Lake Millerton and Hwy. 99
- Next sampling round begins on Tuesday Oct. 27
- Special thanks to MP-157 for taking care of all the sampling gear (e.g., bottles, coolers, etc.) So far they have made 8 round trips from Sacramento. There have been a few issues with not processing the samples on time, but overall sampling is going very well.
- Baseline temperature results should be back within the next week. Once verified results have been received they will be released.

- The River's end is expected to reach Chowchilla Bypass (RM 216) in 10-12 days, and Mendota Pool in about 2 weeks. Perennial water in Mendota Pool keeps surrounding groundwater levels higher.
- Stage is stable at Gravelly Ford at 5.10-5.15 ft (160 cfs here when 350 cfs released from Friant)
- Interim flows will increase from 350 to 700 cfs on or about Nov. 1. After 10 days, flows are reduced to 330 cfs and then down to the riparian demand (about 120 cfs). Mendota pool will be drained during the lowest flows because the dam is due for inspection on Nov. 26
- Sack dam gauge will be done next week
- This week there was a meeting with landowners in Reach 3 regarding seepage well transects. 13 new monitoring sites on private land. There will be 25-30 more locations to monitor seepage impacts to adjacent farmlands. Recently 9 new wells were finished just in time to record pre-interim flows water levels.

San Joaquin River Restoration Program
Weekly Interim Flows 2010, Stream Flow and Water Quality Monitoring Update

Meeting Minutes

October 29, 2009
12:30 p.m. – 1:00 p.m.
Conference Call
Call-In Number (877)718-7057, Pass Code 8098142

Invitees:

☒ TJ Kopshy, SWCB
☐ Jeff McLain, USFWS
☒ Carolyn Yale, EPA
☒ Doug DeFlitch, Reclamation
☒ Erin Rice, Reclamation
☐ Chris Eacock, Reclamation
☐ Rhonda Reed, NMFS
☐ Gerald Hatler, DFG
☐ Erin Strange, NMFS
☐ Michelle Workman, USFWS
☐ Kim Webb, USFWS
☐ Ernie Taylor, DWR
☒ Elaina Holburn, Reclamation
☒ Elif Fehm-Sullivan, NMFS
☐ Leslie Mirise, NMFS
☒ Dave Encinas, DWR
☒ Abimael Leon-Cardona, DWR
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☒ Iris Yamagata, DWR
☐ Ali Gasdick, Reclamation
☐ Shannon Brewer, DFG

- End of the River is at RM 220.4, about 4.5 miles upstream from the bifurcation structure; wetting front appears to be slowing
- In Reach 2, maximum seepage rate still. Water levels in shallow wells continue to rise as water infiltrated laterally and downward through the streambed. Many shallow wells downstream from the wetting front are still dry.
- In Reach 3, nine drive point wells have been installed and developed where landowners have expressed concern over seepage. Groundwater levels are currently 6-11 feet below ground surface and there will continue to be monitored during the interim flows.
- Water quality samples are still being collected at 4 sites: Millerton Lake, SJR at Lost Lake, SJR at Hwy 99, and SJR at Gravelly Ford.
- Lab results should be available next week.
- Water surface elevations and flow measurements are being taken in Reach 1A; these measurements will continue when Interim Flows are increased.
- Sack Dam gauge should be done by the end of next week.
- Per the RA’s recommendation, the Interim Flow ramp-up should occur at 10am on October 31.

- Interim flows are expected to reach Mendota pool on November 3 or 4.

San Joaquin River Restoration Program
Weekly Interim Flows 2010, Stream Flow and Water Quality Monitoring Update

Meeting Minutes

November 5, 2009
12:30 p.m. – 1:00 p.m.
Conference Call
Call-In Number (877)718-7057, Pass Code 8098142

Invitees:

- ☐ TJ Kopshy, SWCB
- ☐ Jeff McLain, USFWS
- ☐ Carolyn Yale, EPA
- ☒ Doug DeFlitch, Reclamation
- ☒ Erin Rice, Reclamation
- ☐ Chris Eacock, Reclamation
- ☐ Rhonda Reed, NMFS
- ☐ Gerald Hatler, DFG
- ☐ Erin Strange, NMFS
- ☐ Michelle Workman, USFWS
- ☐ Kim Webb, USFWS
- ☒ Ernie Taylor, DWR
- ☐ Elaina Holburn, Reclamation
- ☐ Elif Fehm-Sullivan, NMFS
- ☐ Leslie Mirise, NMFS
- ☐ Dave Encinas, DWR
- ☐ Abimael Leon-Cardona, DWR
- ☐ Stephen Lee, Reclamation
- ☒ Michelle Banonis, Reclamation
- ☐ John Battistoni, DFG
- ☐ Karen Dulik, DWR
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- ☒ Iris Yamagata, DWR
- ☐ Ali Gasdick, Reclamation
- ☐ Shannon Brewer, DFG
- ☐ Eric Guzman, DFG

- Interim flows increased from 350 to 700 cfs on Nov. 1
- Two stage increases were observed following the increase in Interim Flows. Stage initially increased, then leveled off as the river captured a side channel or gravel pit, and then increased again
- 332 cfs at Gravelly Ford this morning
- Wetted front pace has begun to increase again
- The River end is 2.8 miles upstream from the Bifurcation Structure as of 7:30 this morning
- Sack Dam monitoring station was completed today
- Baseline water quality results are coming soon and will be sent to the group

San Joaquin River Restoration Program
Weekly Interim Flows 2010, Stream Flow and Water Quality Monitoring Update

Meeting Minutes

November 12, 2009
12:30 p.m. – 1:00 p.m.
Conference Call
Call-In Number (877)718-7057, Pass Code 8098142

Invitees:

- ☐ TJ Kopshy, SWCB
- ☐ Jeff McLain, USFWS
- ☒ Carolyn Yale, EPA
- ☒ Doug DeFlitch, Reclamation
- ☒ Erin Rice, Reclamation
- ☐ Chris Eacock, Reclamation
- ☐ Rhonda Reed, NMFS
- ☐ Gerald Hatler, DFG
- ☐ Erin Strange, NMFS
- ☐ Michelle Workman, USFWS
- ☐ Kim Webb, USFWS
- ☐ Ernie Taylor, DWR
- ☐ Elaina Holburn, Reclamation
- ☐ Elif Fehm-Sullivan, NMFS
- ☒ Leslie Mirise, NMFS
- ☒ Dave Encinas, DWR
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- ☐ John Battistoni, DFG
- ☐ Karen Dulik, DWR
- ☐ Roger Guinee, USFWS
- ☒ Iris Yamagata, DWR
- ☐ Ali Gasdick, Reclamation
- ☐ Shannon Brewer, USFWS
- ☐ Eric Guzman, DFG

- Interim flows were reduced from 700 to 350 cfs on November 11 and will be reduced back to riparian demand on November 21
- On the morning of November 12 Gravelly Ford was showing 496 cfs
- Interim flows reached San Mateo Avenue (considered the beginning of backwater effects of Mendota Pool) at about 7:30 this morning. Expected inflow for Mendota Pool is 80cfs, or 160 ac-ft over the next 24 hours
- Groundwater updates (all depths are depth to water from ground surface):
    - Reach 2B drive point wells on private property: 5.6-10.4 ft
    - San Mateo Ave. transect (between Chowchilla Bifurcation Structure & Mendota Pool): 11.5-40 ft
    - Jensen Ranch (RM 255, mid-Reach 1A): 18-32 ft
    - Reach 3: 9-14 ft
    - Shields Ave (RM 223.8, between GF & Chowchilla): 14-72ft
- Reclamation staff continue to collect water quality samples from the River wetted by Interim Flows.
- First water quality samples from below Chowchilla Bypass collected November 10
- Last water sampling trip will be on November 17

- Sediment samples will be collected in mid-December
- Lab data is currently being reviewed by Reclamation's Quality Assurance staff
- The WRO requires a monitoring report by January 1, 2010. Chris will begin the report with a compilation of lab and real-time data. An ad hoc committee is needed to review the data and recommend a monitoring program for 2010 releases before December 20.

San Joaquin River Restoration Program
Weekly Interim Flows 2010, Stream Flow and Water Quality Monitoring Update

Meeting Minutes

November 19, 2009
12:30 p.m. – 1:00 p.m.
Conference Call
Call-In Number (877)718-7057, Pass Code 8098142

Invitees:

- ☒ TJ Kopshy, SWCB
- ☐ Jeff McLain, USFWS
- ☐ Carolyn Yale, EPA
- ☒ Doug DeFlitch, Reclamation
- ☐ Erin Rice, Reclamation
- ☒ Chris Eacock, Reclamation
- ☐ Rhonda Reed, NMFS
- ☐ Gerald Hatler, DFG
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- ☐ Roger Guinee, USFWS
- ☒ Iris Yamagata, DWR
- ☐ Ali Gasdick, Reclamation
- ☐ Shannon Brewer, USFWS
- ☐ Eric Guzman, DFG

- The CDEC gauge at Sack Dam is online and registering stage only at this time.
- Doug reported that the flows were reduced on November 11th from 700 cfs to 350 cfs, and will be reduced from 350 cfs to 120 cfs at approximately 10:00 a.m. on November 21st.
- Once flows are reduced to baseline (120 cfs), we will see how they work through the system.
- There is 57 cfs at the bifurcation structure, which is expected to taper off in the next few days
- Chris reports that, per the water rights order, we have obtained all sampling as specified. The last round was collected on Tuesday, between Millterton Lake and Sack Dam. There are over 500 samples currently being analyzed.
- Pesticides are coming through as non-detects. Some bacteria at Lost Lake, but nothing surprising. Staff is to QA/QC the results.
- Chris reports that he will be collecting the sediment samples
- Chris and TJ both mentioned that per the water rights order, a monitoring plan is to be developed with input from USFWS, DFG, and the Regional

Board. Michelle will contact Chris, TJ, Ernie, USFWS, and DFG to set up a meeting to work on monitoring plan.

San Joaquin River Restoration Program
Weekly Interim Flows 2010, Stream Flow and Water Quality Monitoring Update

Meeting Minutes

February 4, 2010
12:30 p.m. – 1:00 p.m.
Conference Call
Call-In Number (877)718-7057, Pass Code 8098142

Invitees:

- ☒ TJ Kopshy, CVRWQCB
- ☒ Jeff McLain, USFWS
- ☐ Carolyn Yale, EPA
- ☒ Doug DeFlitch, Reclamation
- ☐ Erin Rice, Reclamation
- ☒ Chris Eacock, Reclamation
- ☐ Rhonda Reed, NMFS
- ☒ Gerald Hatler, DFG
- ☐ Erin Strange, NMFS
- ☐ Michelle Workman, USFWS
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- ☒ Ernie Taylor, DWR
- ☐ Elaina Holburn, Reclamation
- ☒ Stephanie Rickabaugh, USFWS
- ☒ Katrina Harrison, Reclamation
- ☐ Seth Gentzler, URS
- ☐ Russ Grimes, ICF
- ☐ Elif Fehm-Sullivan, NMFS
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- ☒ Iris Yamagata, DWR
- ☐ Ali Gasdick, Reclamation
- ☐ Shannon Brewer, USFWS
- ☐ Eric Guzman, DFG
- ☒ Jeanne Chilcott, CVRWQCB
- ☐ Laura Myers, Reclamation
- ☐ Stacy Porter, CDM

Flow Status:

- Flows are being released out of Friant Dam at 350 cfs.
- This morning, flows were at 50-80 cfs, and this afternoon, they were nearing 100 cfs on CDEC.
- Last October, flows took approximately 62 hours to reach Gravelly Ford. During this Interim Flow period, it took 46 hours for flows to reach Gravelly Ford.
- At the next meeting, an update will be provided on projected flows from the dam after February 28th (depending on water year type).

Water Quality Monitoring Status:

- Many results for the last series of monitoring resulted in non-detects for many constituents, specifically pesticides. Many results for the last series of monitoring resulted in non-detects for many constituents, specifically pesticides. In some cases, the reporting limits utilized by the laboratories were up to 500-times greater than the water quality criteria currently under public review for aquatic life (e.g. the detection limit utilized for bifenthrin was 0.5 ug/L while the proposed criteria ranges from 0.0003 to 0.004 ug/L). It is being verified with the laboratories that their detection limits are adequate to address any potential concerns regarding water quality tolerances for human or aquatic life.

- It is being verified with the laboratories that their detection limits are adequate to address any potential concerns regarding water quality tolerances for human or aquatic life.
- Currently working on a revised monitoring plan. This plan will include a list of parameters that will be developed based on unique characteristics of each monitoring location.
- Water samples will be taken today at Lost Lake and Gravelly Ford.
- Currently working with San Joaquin River Stewardship Program to share water quality monitoring results from volunteer work.

Groundwater Monitoring Status:

- No report

Other News:

- DWR is working through the permitting and pre-construction notification to install the gage at Sand Slough/Washington Bridge. This is anticipated to be online by the end of the month. Flows are not expected to reach Sand Slough until the 2nd or 3rd week of March.
- Both the Restoration Administrator Recommendations for this water year and the current version of the Water Quality Monitoring Plan are available on the SJRRP website at: http://www.restoresjr.net/

Next Meeting:

- The next conference call is February 11, 2010 at 12:30 p.m. Call in number (877)718-7057, passcode 8098142.

San Joaquin River Restoration Program
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- ☐ Shannon Brewer, USFWS
- ☐ Eric Guzman, DFG
- ☒ Laura Meyers, Reclamation
- ☒ Martin Steinpress, B&C
- ☒ Katrina Harrison, Reclamation
- ☐ Seth Gentzler, URS

Flow Status:

- Flows have been released from Friant Dam at 350 cfs since February 1st. Flows were increased to 400 cfs on February 11th at around noon to reach flow target of 255 cfs at Gravelly Ford. Currently, water is passing Gravelly Ford is at approximately 194 cfs.
- Water is about 2/3 of the way to the Chowchilla Bifurcation Structure
- We will know more next week as to the status of the water year type and the proposed flow release schedule.

Water Quality Monitoring Status:

- Samples have been taken at Lost Lake. Samples were taken at Skaggs Bridge in lieu of Gravelly Ford this week (just upstream), and samples in upcoming weeks will continue to be taken at Gravelly Ford.
- Will be adding Camp Pashayan to the sample locations.

- The sample schedule for the upper reaches will be going to monthly sampling.
- Chris will send the updated Water Quality Monitoring Plan.

Groundwater Monitoring Status:

- Tuesday and Thursday there will be measurements taken of groundwater levels at specified transects. Today, measurements taken in Reaches 3 and 4.
- Groundwater is behaving very similarly to last fall.
- As part of the Seepage Management Plan, a weekly groundwater monitoring report will be prepared.
- There are three real-time wells available on CDEC, Station IDs R31, R37, and W54.

Other News:

- DWR is approximately 75% complete with the installation of the gage at Reach 4B. It is anticipated that this gage will be complete the first part of next week.

Next Meeting:

- The next conference call is February 18, 2010 at 12:30 p.m. Call-in number (877)718-7057, passcode 8098142.

San Joaquin River Restoration Program
Weekly Interim Flows 2010, Stream Flow and Water Quality Monitoring Update

Meeting Minutes

February 18, 2010
12:30 p.m. – 1:00 p.m.
Conference Call
Call-In Number (877)718-7057, Pass Code 8098142

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☐ Martin Steinpress, B&C
☒ Katrina Harrison, Reclamation
☐ Seth Gentzler, URS

Flow Status:

- Release at Friant Dam currently 400 cfs.
- SLDMWA reports river is 2 miles upstream from the Bifurcation Structure.
- Flows will likely reach the Bifurcation Structure in 2-3 days and likely reach Mendota Pool next week.
- Recent measurement at Gravelly Ford will be released following QA/QC.
- Year type determination postponed until allocations are determined Feb. 26.

Water Quality Monitoring Status:

- Samples collected yesterday (2/17) at Lost Lake, Highway 99, and Gravelly Ford.
- Next week samples will be collected below Mendota Dam.

- Week of March 3 samples to be collected at Sack Dam.
- Following March 3 sampling will be monthly.
- Sediment samples scheduled for April and October.
- The release of the Water Quality Monitoring Report has been delayed as there has been some trouble in the lab. Sediment samples have been sent back for reanalysis. Trying to reconcile minimum detection levels/ minimum reporting limits for pesticides. Report will be released following completion of the reanalysis.

Groundwater Monitoring Status:

- There are currently three levels of groundwater monitoring taking place:
    1. Three real-time monitoring wells; 1 in Reach 2B, 2 in Reach 3.
    2. Weekly manual soundings in monitoring wells in Reaches 2,3, and 4.
        a. Similar responses are being observed as last fall.
        b. The local groundwater table is hydraulically well connected to the river.
        c. A response has also been observed in the deeper wells measuring regional groundwater table.
        d. The river is progressing faster than last fall through Reach 2 because of wetter antecedent conditions.
        e. Reach 3 wells are being observed for potential impacts.
    3. Transducers measuring hourly data
        a. Anticipate 2-3 downloads per year.
        b. Weekly groundwater summary report for key locations
        c. Observing groundwater levels in relation to thresholds.
        d. Information available on www.restoresjr.net

Other News:

Next Meeting:

- The next conference call is February 25, 2010 at 12:30 p.m. Call-in number (877)718-7057, passcode 8098142.

San Joaquin River Restoration Program
Weekly Interim Flows 2010, Stream Flow and Water Quality Monitoring Update

Meeting Minutes

February 25, 2010
12:30 p.m. – 1:00 p.m.
Conference Call
Call-In Number (877)718-7057, Pass Code 8098142

Invitees:

- [x] TJ Kopshy, CVRWQCB
- [ ] Jeff McLain, USFWS
- [ ] Carolyn Yale, EPA
- [ ] Doug DeFlitch, Reclamation
- [ ] Erin Rice, Reclamation
- [ ] Chris Eacock, Reclamation
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- [ ] Laura Meyers, Reclamation
- [x] Martin Steinpress, B&C
- [x] Katrina Harrison, Reclamation
- [ ] Seth Gentzler, URS

Flow Status:

- Release at Friant Dam currently 400 cfs.
- River is between Chowchilla Bifurcation and San Mateo Ave.
- Flows will likely reach Mendota Pool today or tomorrow.
- The flow at Gravelly Ford is 290 cfs according to CDEC; meeting flow target
- Year type determination postponed until allocations are determined Feb. 26.

Gages:

- Gage at San Mateo –
  - Went out to talk to the landowner on Tuesday, 2/23
  - Permitting will take months

- Ernie Taylor reported that the installation of the Washington Road gage at Sand Slough has been completed
    - Water Quality sensor isn't yet in
    - Is currently reporting stage, no flow yet because no rating curve has been developed
    - CDEC code: SWA: http://cdec.water.ca.gov/cgi-progs/staMeta?station_id=SWA

Groundwater Monitoring Status:

- We have 3 realtime wells, they're posted on the "Interim Flows Information" page on restoresjr.net – MW-54B, R3-1, and R3-7
- The local Groundwater table is hydraulically well connected to the river in losing reaches
- Weekly Groundwater Report: http://restoresjr.net/activities/if/WklyGWRept20100220.pdf
    - Measurements in 14 key wells done weekly and posted on Fridays
    - Contain site-specific buffer zones
    - R2B-1 is a critical well, it has a buffer of 4-6'
        - The water isn't there yet, but it is currently it is at 6.1 feet bgs
        - Currently in a mode to pay close attention to it
        - Talking to Sarge Green and Randy, they're explaining the situation to landowners
        - If it continues to increase we will start discussing mitigation
        - Are hoping to do a hand auger boring in the middle of the field nearby to test the slope of the groundwater away from the river, and some salinity assessments

Other News:

Next Meeting:

- The next conference call is March 4, 2010 at 12:30 p.m. Call-in number (877)718-7057, passcode 8098142.

San Joaquin River Restoration Program
Weekly Interim Flows 2010, Stream Flow and Water Quality Monitoring Update

Meeting Minutes

March 4, 2010
12:30 p.m. – 1:00 p.m.
Conference Call
Call-In Number (877)718-7057, Pass Code 8098142

Invitees:

- [x] TJ Kopshy, CVRWQCB
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- [ ] Seth Gentzler, URS

Flow Status:

- Release at Friant Dam increased on March 1st to 500 cfs.
- Due to large amounts of precipitation, river flows have increased. Approximately 800-900 cfs of additional water from rainfall is coming into the river below Friant Dam.
- Water is currently about 1 mile below the Washington Road crossing.
- Storm flows have moved water faster and further. Flows are now coming into the Lower San Joaquin Levee District's area.

Gages:

- Installation of the Washington Road gage is complete. DWR is working to install the water quality sensor.

Water Quality Monitoring Status

- Chris is working with staff to collect water samples from Lost Lake, Highway 99, Gravelly Ford, Mendota Dam, below Sack Dam, at Highway 152, and at Washington Road.
- Chris is working on some minor revisions to the Water Quality Monitoring Plan based on comments received.
- A new real-time monitoring station at Hills Ferry is now on CDEC, and has the locator “SMN”.

Groundwater Monitoring Status:

- New groundwater monitoring wells are being coordinated throughout Reaches 3 and 4.
- Groundwater continues to be monitored in wells adjacent to the river in accordance with the Program’s Seepage Management Plan
- Monitoring the R2B-1 well closely. The buffer zone is from 4 to 6 feet below ground surface. The levels in the well are slightly less than 6 feet.
- Stephen provided manual groundwater measurements for February and these are on the SJRRP website.
- Real-time groundwater monitoring data is available for 3 wells with links on the SJRPP website

Other News:

Carolyn Yale reported that Jeanne Chilcott sent out to the group information on a funding opportunity through the EPA. The website is:
http://www.epa.gov/region9/water/watershed/sfbay-delta.html
Please contact Carolyn or Jeanne with any questions.

Next Meeting:

- The next conference call is March 11, 2010 at 12:30 p.m. Call-in number (877)718-7057, passcode 8098142.

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- ☒ Margarita Gordus, DFG

Flow Status:

- Release at Friant Dam increased on March 1^{st} to 500 cfs.
- There was a lot of precipitation last week, which caused a temporary spike in flows
- Flows into Gravelly Ford at 460 cfs right now, 300 cfs into Mendota Pool.
- Mendota Pool is releasing 432 cfs with around 150 of this diverted at Arroyo Canal for around 280 cfs of SJRRP releases from Sack Dam.
- Some recirculation credit is building up in San Luis due to less water exiting Mendota Pool then is entering.
- Flows ramp up to 800 cfs on Monday, March 15^{th}.

Water Quality Monitoring Status

- Currently doing QA on 2009 sediment data

- 2009 Water Quality data checking is mostly done
- Chris collected samples last Thursday from Lost Lake, Highway 99, Gravelly Ford, Mendota Dam, below Sack Dam, and at Highway 152.
- Still trying to figure out what to do with pesticides, due to their expense and 2009 tests coming back as non-detect. May not be testing to a low enough detection limit.
- Chris is working on some minor revisions to the Water Quality Monitoring Plan based on comments received.

Groundwater Monitoring Status:

- 16 new groundwater monitoring wells are being coordinated throughout Reaches 3 and 4.
- Drilling is set to start in Reach 3 next week.
- Groundwater continues to be monitored in wells adjacent to the river in accordance with the Program's Seepage Management Plan
- Monitoring the R2B-1 well closely. The buffer zone is from 4 to 6 feet below ground surface. The levels in the well are at 5.57 feet and stabilizing.
- Weekly Groundwater Reports on the Interim Flows page of the SJRRP website, updated on Fridays.
- Real-time groundwater monitoring data is available for 3 wells with links on the SJRPP website

Other News:

Next Meeting:

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- [ ] Margarita Gordus, DFG

Flow Status:

- Friant Dam Release increased from 500-800 cfs on Tuesday at 10am
- The increase began to reach Gravelly Ford today; approximately 500 cfs there
- 360 estimated at Chowchilla Bifurcation Structure
- 330 cfs into Mendota Pool
- 285 cfs for SJRRP released from the Pool
- 130-225 released for Arroyo Canal demand
- DWR measured 331 below Sack Dam, and 270 at Washington Rd.
- DWR working on datalogger at Washington Rd. because of data gaps

Groundwater Monitoring Status:

- Drilling for new wells starts tomorrow in Reaches 3 and 4
- 28 new wells are cleared for drilling
- Each well will take 1-1.5 days to complete
- Drilling with take about 2 months to complete
- Watching a couple wells in Reach 2 within the buffer zone
- 4-6 feet below ground surface for annual crops, 6-8 bgs for trees
- Weekly Groundwater Report on Fridays
- Real time monitoring at 3 locations

Water Quality Monitoring Status

- No new information at this time.
- Continuing to work on the October data.

Other News:

Next Meeting:

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Weekly Interim Flows 2010, Stream Flow and Water Quality Monitoring Update

Meeting Minutes

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- ☒ Margarita Gordus, DFG

Flow Status:

- 807cfs current release from Friant
- 660 Gravelly Ford
- 500 Chowchilla Bifurcation Structure
- 470 into Mendota Pool at San Mateo Ave.
- 470- 5% losses in pool = 445 release from Mendota Dam for SJRRP
- 620= Total Mendota Dam release in Reach 3 (445 + 175 for SLCC demand at Arroyo Canal)
- 435 measured at Sack Dam; approximately 450 on CDEC

- The DWR's Washington Road streamflow measurement site is problematic because it will obstruct maintenance activities by the Levee District. This site will be removed by September. There are issues with backwater effects in this area so it is still unclear where the new site will be. DWR will operate both sites for an overlapping period.

- Today's (3/25) flow bench evaluation delay the increased release to 1100 cfs at Friant until the bench can be reevaluated Monday (3/29). The 800 cfs flows have not been long enough for groundwater levels to sufficiently stabilize.

Groundwater Monitoring Status:

- 4 new wells completed in Reach 3 last week. These are still being developed and should report groundwater levels next week.
- Including these 4 new wells, 28 wells are cleared for drilling in Reaches 3 and 4.
- Approximately 65 wells are in place for SJRRP.
- Several wells in Reach 2 are being watched closely and considered for the Flow Bench Evaluations. There are 3 wells within the buffer zone (either 4-6 for annuals or 6-8 for trees/vines).
- Well 54B is not completely normalized and this and other wells are the reason for the delay of flow increase to 1100 cfs.

Water Quality Monitoring Status

- No new sampling this week.
- Early April all sites along river will be sampled: water and sediment.
- Chris received today preliminary results from the lab for sediment toxicity for Fall 2009 monitoring.

Other News:

Next Meeting:

- The next conference call is April 1, 2010 at 12:30 p.m. Call-in number (877)718-7057, passcode 8098142.

San Joaquin River Restoration Program
Weekly Interim Flows 2010, Stream Flow and Water Quality Monitoring Update

Meeting Minutes

April 1, 2010
12:30 p.m. – 1:00 p.m.
Conference Call
Call-In Number (877)718-7057, Pass Code 8098142

Invitees:

☐ TJ Kopshy, CVRWQCB
☐ Jeff McLain, USFWS
☐ Carolyn Yale, EPA
☐ Doug DeFlitch, Reclamation
☒ Erin Rice, Reclamation
☒ Chris Eacock, Reclamation
☐ Rhonda Reed, NMFS
☐ Gerald Hatler, DFG
☐ Erin Strange, NMFS
☐ Michelle Workman, USFWS
☐ Kim Webb, USFWS
☐ Ernie Taylor, DWR
☒ Elaina Holburn, Reclamation
☐ Jeanne Chilcott, CVRWQCB
☒ Stephanie Rickabaugh, USFWS
☐ Tom Taylor, Entrix
☐ Russ Grimes, ICF
☐ Dana White, DWR
☐ Brian Paulson, DWR
☐ Elif Fehm-Sullivan, NMFS
☒ Leslie Mirise, NMFS
☐ Dave Encinas, DWR
☒ Abimael Leon-Cardona, DWR
☐ Stephen Lee, Reclamation
☒ Michelle Banonis, Reclamation
☐ John Battistoni, DFG
☐ Karen Dulik, DWR
☐ Roger Guinee, USFWS
☐ Iris Yamagata, DWR
☐ Ali Gasdick, Reclamation
☐ Shannon Brewer, USFWS
☐ Eric Guzman, DFG
☐ Laura Meyers, Reclamation
☐ Martin Steinpress, B&C
☐ Katrina Harrison, Reclamation
☐ Seth Gentzler, URS
☐ Margarita Gordus, DFG

Flow Status:

- Friant Dam release began ramping up from 800-1100 cfs on March 29.
- SJRRP/ Mendota Pool Daily Operations, 4/1/10:
  - Friant Dam: 1096 cfs
  - Gravelly Ford: 897 cfs
  - below Bifurcation: 602 cfs
  - San Mateo: 572 cfs
  - Mendota Dam release for SJRRP: 543 cfs (572- 5% loss)
  - Sack Dam: 543 cfs
- USGS and Reclamation met on Wednesday at “near Mendota” gauge to coordinate a common understanding of measurement methodologies.
- Manual streamflow measurements:

- USGS- Monday: below Friant at Lost Lake, Tuesday: Bifurcation Structure, Gravelly Ford, Wednesday: Hwy 41, Mendota, Thursday: Skaggs Bridge
- Reclamation- Tuesday: San Mateo, Thursday: Gravelly Ford, San Mateo, Bifurcation Structure
- DWR- Monday and Friday: Sack Dam and Washington Road

Groundwater Monitoring Status:

- 6 new wells completed in Reaches 3-4 to date for current drilling phase
- Several wells in Reach 2 are being watched closely and considered in flow bench evaluations
- Weekly groundwater report every Friday and posted on SJRRP website
- Reclamation responded to a seepage monitoring call in Reach 4. Measured water levels in an existing CCID well and completed hand auger borings in areas of concern. Water levels were below action levels (buffer zone as defined in Seepage Mgmt Plan).

Water Quality Monitoring Status

- Summary of WQ sampling to occur in the first week of April:

River Mile	Location		Water	Sediment
266	SJR below Friant Dam (Lost Lake Park)	X	X	
243	SJR at Highway 99 (Camp Pashayan)		X	
228	SJR at Gravelly Ford		X	X
210	SJR at San Mateo Ford			X
	Mendota Wildlife Management Area			X
206	Mendota Pool, above Mendota Dam			X
205	SJR below Mendota Dam		X	X
174	SJR at Highway 152		X	X
125	SJR at Fremont Ford		X	
118	SJR above Merced River (Hills Ferry)	X	X	

Water Analyses (seven sites plus QA):
Total suspended solids,
Nutrients (nitrate + nitrite as N, total ammonia, total Kjeldal nitrogen, total phosphate, chlorophyll), Total and dissolved organic carbon, Bacteria (fecal and total coliform, E. coli), Anions (alkalinity, bicarbonates, carbonates, chloride), Cations (calcium, magnesium, potassium, sodium), Trace Elements (arsenic, boron, copper, chromium, lead, nickel, mercury, molybdenum, selenium, zinc), and Pesticides (Organochlorine scan, pyrethroid scan, carbamates, orthophosphate scan).

Bed Sediment Analyses (eight sites):
Total organic carbon,

Trace Elements (arsenic, boron, copper, chromium, lead, nickel, mercury, molybdenum, selenium, zinc), and Pesticides (Organochlorine scan, pyrethroid scan).

Other News:

- Article in the Chronicle this week about SJRRP

Next Meeting:

- The next conference call is April 8, 2010 at 12:30 p.m. Call-in number (877)718-7057, passcode 8098142.

San Joaquin River Restoration Program
Weekly Interim Flows 2010, Stream Flow and Water Quality Monitoring Update

Meeting Minutes

April 15, 2010
12:30 p.m. – 1:00 p.m.
Conference Call
Call-In Number (877)718-7057, Pass Code 8098142

Invitees:

☒ TJ Kopshy, CVRWQCB	☐ Elif Fehm-Sullivan, NMFS
☐ Jeff McLain, USFWS	☒ Leslie Mirise, NMFS
☐ Carolyn Yale, EPA	☐ Dave Encinas, DWR
☐ Doug DeFlitch, Reclamation	☒ Abimael Leon-Cardona, DWR
☒ Erin Rice, Reclamation	☒ Stephen Lee, Reclamation
☒ Chris Eacock, Reclamation	☐ Michelle Banonis, Reclamation
☐ Rhonda Reed, NMFS	☐ John Battistoni, DFG
☐ Gerald Hatler, DFG	☐ Karen Dulik, DWR
☐ Erin Strange, NMFS	☐ Roger Guinee, USFWS
☐ Michelle Workman, USFWS	☒ Iris Yamagata, DWR
☐ Kim Webb, USFWS	☐ Ali Gasdick, Reclamation
☒ Ernie Taylor, DWR	☐ Shannon Brewer, USFWS
☒ Elaina Holburn, Reclamation	☐ Eric Guzman, DFG
☐ Jeanne Chilcott, CVRWQCB	☐ Laura Meyers, Reclamation
☒ Stephanie Rickabaugh, USFWS	☐ Martin Steinpress, B&C
☐ Tom Taylor, Entrix	☐ Katrina Harrison, Reclamation
☒ Russ Grimes, ICF	☐ Seth Gentzler, URS
☐ Dana White, DWR	☒ Margarita Gordus, DFG
☐ Brian Paulson, DWR	

Flow Status:

- Friant release now 1250 cfs
- Chowchilla Bifurcation Structure 1018 cfs, San Mateo 988 cfs, Sack Dam 700 cfs
- Sack Dam target is now 700 cfs due to seepage concerns in Reach 3.

Groundwater Monitoring Status:

- 12 new wells have been completed from the current set of approved wells
- These wells are being developed an initial water levels are being taken
- 3 new real-time wells will be installed
- Wells in Reaches 2 & 4 are being watched closely while Friant releases are increased

Water Quality Monitoring Status

- Water samples at 7 sites last Wednesday
- No sampling this week
- Sediment samples at 8 sites next week
- Making progress on Fall 2009 data

Other News:

Next Meeting:

- The next conference call is April 22, 2010 at 12:30 p.m. Call-in number (877)718-7057, passcode 8098142.

San Joaquin River Restoration Program
Weekly Interim Flows 2010, Stream Flow and Water Quality Monitoring Update

Meeting Minutes

April 22, 2010
12:30 p.m. – 1:00 p.m.
Conference Call
Call-In Number (877)718-7057, Pass Code 8098142

Invitees:

- ☐ TJ Kopshy, CVRWQCB
- ☐ Jeff McLain, USFWS
- ☒ Carolyn Yale, EPA
- ☒ Doug DeFlitch, Reclamation
- ☒ Erin Rice, Reclamation
- ☒ Chris Eacock, Reclamation
- ☐ Rhonda Reed, NMFS
- ☐ Gerald Hatler, DFG
- ☐ Erin Strange, NMFS
- ☒ Michelle Workman, USFWS
- ☐ Kim Webb, USFWS
- ☐ Ernie Taylor, DWR
- ☐ Elaina Holburn, Reclamation
- ☐ Jeanne Chilcott, CVRWQCB
- ☐ Stephanie Rickabaugh, USFWS
- ☐ Tom Taylor, Entrix
- ☐ Russ Grimes, ICF
- ☐ Dana White, DWR
- ☒ Brian Paulson, DWR
- ☐ Elif Fehm-Sullivan, NMFS
- ☒ Leslie Mirise, NMFS
- ☐ Dave Encinas, DWR
- ☒ Abimael Leon-Cardona, DWR
- ☒ Stephen Lee, Reclamation
- ☒ Michelle Banonis, Reclamation
- ☐ John Battistoni, DFG
- ☐ Karen Dulik, DWR
- ☐ Roger Guinee, USFWS
- ☐ Iris Yamagata, DWR
- ☐ Ali Gasdick, Reclamation
- ☐ Shannon Brewer, USFWS
- ☐ Eric Guzman, DFG
- ☐ Laura Meyers, Reclamation
- ☐ Martin Steinpress, B&C
- ☒ Katrina Harrison, Reclamation
- ☐ Seth Gentzler, URS
- ☐ Margarita Gordus, DFG

Flow Status:

- Friant release increased from 1250-1350 last Saturday, decreased on Monday to 1100 due to WQ concerns
- Current Friant release is 1100 cfs, Gravelly Ford 1225 (due to trib. Inflow), Chowchilla Bifurcation 1060, Mendota Pool inflow 1030, Mendota Dam 700, Sack Dam 700
- Likely increase on Friday to 1350 cfs
- Due to higher inflows to Mendota pool than releases (700 cfs target at Sack Dam for SJRRP due to potential seepage impacts in Reach 4A), approximately 270 cfs was recirculated in the Pool
  - This resulted in decreased Delta Mendota Canal deliveries to the Pool
  - As return flows continued to enter the DMC, EC began to rise in the canal, and in the Pool

  - EC concerns, and poor mixing in the Pool lead to the decision to send DMC water (approximately 90 cfs) into the Firebaugh Wasteway, which enters the River within Reach 3
  - With no DMC water entering the Pool, SJR water should clear EC issues in the Pool and Fresno Slough

Groundwater Monitoring Status:

- Completed 15 new monitor wells in Reaches 3-4 to date for the current phase of drilling. 11 of the 15 wells have been developed by bailing and pumping and initial water levels have been measured. The new wells will be incorporated into the SJRRP GW monitoring network. Drilling has been suspended this week due to bad weather.
- 3 of the new wells (MW-75, MW-92, and MW-89) will be outfitted with real time equipment which will transmit hourly water-level data to CDEC with links to the SJRRP website. Bad weather this week has resulted in a delay for the installations…stay tuned.
- Seepage evaluations are being conducted on an ongoing basis at sites in Reaches 2,3 and 4 at the request of landowners and in response to thresholds being approached at key monitoring locations. The information from these evaluations is being considered on a site by site basis for the SJRRP Flow Bench Evaluations.
- Met with a landowner in Reach 4B that is interested in installing additional monitoring wells that will be incorporated in the next phase of drilling planned for this summer.

Water Quality Monitoring Status

- Sediment sampling at 7 sites on Wednesday 4/21

Other News:

Next Meeting:

- The next conference call is April 29, 2010 at 12:30 p.m. Call-in number (877)718-7057, passcode 8098142.

San Joaquin River Restoration Program
Weekly Interim Flows 2010, Stream Flow and Water Quality Monitoring Update

Meeting Minutes

April 29, 2010
12:30 p.m. – 1:00 p.m.
Conference Call
Call-In Number (877)718-7057, Pass Code 8098142

Invitees:

- [x] TJ Kopshy, CVRWQCB
- [ ] Jeff McLain, USFWS
- [x] Carolyn Yale, EPA
- [ ] Doug DeFlitch, Reclamation
- [x] Erin Rice, Reclamation
- [x] Chris Eacock, Reclamation
- [ ] Rhonda Reed, NMFS
- [ ] Gerald Hatler, DFG
- [ ] Erin Strange, NMFS
- [ ] Michelle Workman, USFWS
- [ ] Kim Webb, USFWS
- [ ] Ernie Taylor, DWR
- [ ] Elaina Holburn, Reclamation
- [ ] Jeanne Chilcott, CVRWQCB
- [x] Stephanie Rickabaugh, USFWS
- [ ] Tom Taylor, Entrix
- [ ] Russ Grimes, ICF
- [ ] Dana White, DWR
- [ ] Brian Paulson, DWR
- [x] Elif Fehm-Sullivan, NMFS
- [ ] Leslie Mirise, NMFS
- [x] Dave Encinas, DWR
- [ ] Abimael Leon-Cardona, DWR
- [x] Stephen Lee, Reclamation
- [x] Michelle Banonis, Reclamation
- [ ] John Battistoni, DFG
- [ ] Karen Dulik, DWR
- [ ] Roger Guinee, USFWS
- [ ] Iris Yamagata, DWR
- [ ] Ali Gasdick, Reclamation
- [ ] Shannon Brewer, USFWS
- [ ] Eric Guzman, DFG
- [ ] Laura Meyers, Reclamation
- [ ] Martin Steinpress, B&C
- [x] Katrina Harrison, Reclamation
- [ ] Seth Gentzler, URS
- [x] Margarita Gordus, DFG

Flow Status:

- 4/29 Friant release 1350 cfs
- Gravelly Ford 1200 cfs, Chowchilla Bifurcation Structure1098, San Mateo 1068, Sack Dam 700
- Firebaugh Wasteway inflows to Reach 3 ended 4/29, peaking at 400 cfs on 4/25
- SLCC demand at Arroyo Canal is 175 cfs
- Normal-Wet year has been changed to Wet year-type designation

Groundwater Monitoring Status:

- 15 new wells in Reaches 3 & 4 are developed
- 3 new real-time wells:
  - #75, downstream of Mendota Dam (Reach 3)
  - #92, upstream from Sand Slough Control Structure (Reach 4)

  - #80, downstream from Hwy 152, (Reach 4)
- Locations for real-time monitoring are selected where river seepage is likely the primary impact to GW. These will serve as an early indicator.
- 6-10 sites for next round of monitoring well drilling Fall 2010. Still identifying new sites.
- SJRRP monitoring well network includes Reclamation-installed wells (approx 60), and preexisting irrigation district producing wells. The total count is approximately 77 wells at this time.

Water Quality Monitoring Status

- MP-157 will be taking additional grab samples from Firebaugh Wasteway
- **Action item**: Document Operational Change (use of Wasteway to clear salinity issues in DMC and Mendota Pool)

Other News:

Next Meeting:

- The next conference call is May 6, 2010 at 12:30 p.m. Call-in number (877)718-7057, passcode 8098142.

San Joaquin River Restoration Program
Weekly Interim Flows 2010, Stream Flow and Water Quality Monitoring Update

Meeting Minutes

May 6, 2010
12:30 p.m. – 1:00 p.m.
Conference Call
Call-In Number (877)718-7057, Pass Code 8098142

Invitees:

- [x] TJ Kopshy, CVRWQCB
- [ ] Jeff McLain, USFWS
- [x] Carolyn Yale, EPA
- [x] Doug DeFlitch, Reclamation
- [x] Erin Rice, Reclamation
- [ ] Chris Eacock, Reclamation
- [ ] Rhonda Reed, NMFS
- [ ] Gerald Hatler, DFG
- [ ] Erin Strange, NMFS
- [ ] Michelle Workman, USFWS
- [ ] Kim Webb, USFWS
- [ ] Ernie Taylor, DWR
- [ ] Elaina Holburn, Reclamation
- [ ] Jeanne Chilcott, CVRWQCB
- [ ] Stephanie Rickabaugh, USFWS
- [ ] Tom Taylor, Entrix
- [ ] Russ Grimes, ICF
- [ ] Dana White, DWR
- [ ] Brian Paulson, DWR
- [x] Elif Fehm-Sullivan, NMFS
- [ ] Leslie Mirise, NMFS
- [ ] Dave Encinas, DWR
- [ ] Abimael Leon-Cardona, DWR
- [ ] Stephen Lee, Reclamation
- [ ] Michelle Banonis, Reclamation
- [ ] John Battistoni, DFG
- [ ] Karen Dulik, DWR
- [ ] Roger Guinee, USFWS
- [ ] Iris Yamagata, DWR
- [ ] Ali Gasdick, Reclamation
- [ ] Shannon Brewer, USFWS
- [ ] Eric Guzman, DFG
- [ ] Laura Meyers, Reclamation
- [ ] Martin Steinpress, B&C
- [x] Katrina Harrison, Reclamation
- [ ] Seth Gentzler, URS
- [ ] Margarita Gordus, DFG

Flow Status:

- 5/1 Friant release increased from 1350 to 1550 cfs
- 1394 at Gravelly Ford; target is 1400
- 1255 at Chowchilla Bifurcation Structure; Reach 2B channel capacity is 1300cfs
- 1225 into Mendota Pool
- 957 being released from Mendota Pool; 257 for Arroyo Canal demand, and 700 for SJRRP to be released below Sack Dam

Groundwater Monitoring Status:

- Stephen was on a seepage hotline call site visit today, his second time this week. Information gathered is used along with routine monitoring well data for the flow bench evaluations. See Weekly GW report on restoresjr.net

- 22 new wells in Reaches 3 & 4 are developed
- 3 new real-time wells:
    - #75, downstream of Mendota Dam (Reach 3) (CDEC W75)
    - #92, upstream from Sand Slough Control Structure (Reach 4) (CDEC W92)
    - #89, downstream from Hwy 152, (Reach 4) (should be completed next week)
- There are plans to conduct a surface-groundwater experiment in Reach 3. Flows will be reduced to approx. 300 cfs below Sack Dam (Reach 4) and hourly data will be collected at over 20 wells to measure groundwater response to flow reduction. This would take place over several weeks.

Water Quality Monitoring Status

- No update this week.

Other News:

Next Meeting:

- The next conference call is May 13, 2010 at 12:30 p.m. Call-in number (877)718-7057, passcode 8098142.

San Joaquin River Restoration Program
Weekly Interim Flows 2010, Stream Flow and Water Quality Monitoring Update

Meeting Minutes

May 13, 2010
12:30 p.m. – 1:00 p.m.
Conference Call
Call-In Number (877)718-7057, Pass Code 8098142

Invitees:

- ☒ TJ Kopshy, CVRWQCB
- ☐ Jeff McLain, USFWS
- ☐ Carolyn Yale, EPA
- ☒ Doug DeFlitch, Reclamation
- ☒ Erin Rice, Reclamation
- ☒ Chris Eacock, Reclamation
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- ☐ Stephanie Rickabaugh, USFWS
- ☐ Tom Taylor, Entrix
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- ☐ Dana White, DWR
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- ☐ Elif Fehm-Sullivan, NMFS
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- ☐ Dave Encinas, DWR
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- ☐ Iris Yamagata, DWR
- ☐ Ali Gasdick, Reclamation
- ☐ Shannon Brewer, USFWS
- ☐ Eric Guzman, DFG
- ☐ Laura Meyers, Reclamation
- ☐ Martin Steinpress, B&C
- ☐ Katrina Harrison, Reclamation
- ☐ Seth Gentzler, URS
- ☐ Margarita Gordus, DFG

Flow Status:

- 1550 cfs Friant Dam release; 1443 Gravelly Ford; 1282 Chowchilla Bifurcation Structure; 1250 into Mendota Pool; 800 Mendota Pool release; 300 Sack Dam release; 500 Arroyo Canal demand

Groundwater Monitoring Status:

- Two recent seepage hotline calls
  - Reach 3, near real-time well. Hand measurements in surrounding field verified readings from well, groundwater at about 6ft.
  - Reach 4, near Washington Road. Grain harvester getting stuck, unable to harvest fields for dairy feed. Shallow groundwater was confirmed to be about 2 feet. This is near Merced NWR.
- Reach 4 experiment: flows past Sack Dam have been reduced from 700 to 300 cfs to allow for observation of the groundwater response to a

reduction in flow. This flow reduction corresponds to about a 1 foot decrease in surface water stage. It is anticipated that 1-2 weeks will be necessary to see a response in the groundwater. The outcome of this study will be an improved understanding of the surface-groundwater connection in Reach 4 and the Eastside Bypass.

  - Another factor which could shorten the length of this study is water quality in the DMC. The difference between SJR flow into and out of Mendota pool is taken by the Exchange Contractors, which reduces their demand for DMC water. Mixing of DMC and SJR water in Mendota Pool seems to be very poor. When DMC flow into Mendota Pool is inadequate, water quality declines in the lower DMC (and Fresno Slough). Several weeks ago, when DMC water quality became very poor, water was sent from the DMC through the Firebaugh Wasteway into Reach 3.

- Current phase of monitoring well drilling is complete. Several wells are still being developed.
- Current phase of drilling included 3 new real-time wells. #89 was completed in Reach 4 this week. One of the real-time wells is currently having difficulty transmitting data.

Water Quality Monitoring Status

- No samples collected last week.
- Month of May samples to be collected soon.
- 2010 data is being pulled together.

Other News:

Next Meeting:

- The next conference call is May 20, 2010 at 12:30 p.m. Call-in number (877)718-7057, passcode 8098142.

San Joaquin River Restoration Program
Weekly Interim Flows 2010, Stream Flow and Water Quality Monitoring Update

Meeting Minutes

May 20, 2010
12:30 p.m. – 1:00 p.m.
Conference Call
Call-In Number (877)718-7057, Pass Code 8098142

Invitees:

- [x] TJ Kopshy, CVRWQCB
- [ ] Jeff McLain, USFWS
- [ ] Carolyn Yale, EPA
- [x] Doug DeFlitch, Reclamation
- [x] Erin Rice, Reclamation
- [ ] Chris Eacock, Reclamation
- [ ] Rhonda Reed, NMFS
- [ ] Gerald Hatler, DFG
- [ ] Erin Strange, NMFS
- [ ] Michelle Workman, USFWS
- [ ] Kim Webb, USFWS
- [ ] Ernie Taylor, DWR
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- [ ] Jeanne Chilcott, CVRWQCB
- [x] Stephanie Rickabaugh, USFWS
- [ ] Tom Taylor, Entrix
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- [ ] Brian Paulson, DWR
- [ ] Elif Fehm-Sullivan, NMFS
- [x] Leslie Mirise, NMFS
- [ ] Dave Encinas, DWR
- [x] Abimael Leon-Cardona, DWR
- [x] Stephen Lee, Reclamation
- [x] Michelle Banonis, Reclamation
- [ ] John Battistoni, DFG
- [ ] Karen Dulik, DWR
- [ ] Roger Guinee, USFWS
- [x] Iris Yamagata, DWR
- [ ] Ali Gasdick, Reclamation
- [ ] Shannon Brewer, USFWS
- [ ] Eric Guzman, DFG
- [ ] Laura Meyers, Reclamation
- [ ] Martin Steinpress, B&C
- [x] Katrina Harrison, Reclamation
- [ ] Seth Gentzler, URS
- [ ] Margarita Gordus, DFG

Flow Status:

- 1550 cfs Friant Dam release; 1412 Gravelly Ford; 1270 Chowchilla Bifurcation Structure; 1240 into Mendota Pool; 665 Mendota Pool release; 300 Sack Dam release; 365 Arroyo Canal demand
- Monday, 5/24, the Reach 4A groundwater experiment will be finished
- Flows below Sack Dam expected to increase to 500 on Monday 5/24 and 700 on Tuesday 5/25
- RA transmitted new flow recommendations May 17
    - Friant release will decrease to 800 on Friday May 28
    - RA recommends default flow schedule after May 29
    - A decision has not yet been made on June releases; depends on calculation of default flows.
- Flows into Mendota Pool in excess of Mendota Pool releases are being taken by the Exchange Contractors. DMC water is being stored in San

Luis Reservoir and will be recirculated to the Friant Division Contractors this summer.

- DWR has measured a 100 cfs difference in flows between Sack Dam and Washington Road. This is partly due to seepage losses, and a diversion that is under investigation.
- Sack Dam rating table is developed; Washington Road table is still not fully developed due to interference from algae with streamflow measurements

Groundwater Monitoring Status:

- Last of new wells currently being developed, in Reach 4B. This will provide a good baseline set prior to routing flows through 4B.
- During the Reach 4A groundwater experiment, water surface went down by 1.5 feet, and groundwater has slowly responded by 1/3- ½ ft decline
- Experiment will continue until Monday May 24

Water Quality Monitoring Status:

- No update this week.

Other News:

Next Meeting:

- The next conference call is May 27, 2010 at 12:30 p.m. Call-in number (877)718-7057, passcode 8098142.

San Joaquin River Restoration Program
Weekly Interim Flows 2010, Stream Flow and Water Quality Monitoring Update

Meeting Minutes

May 27, 2010
12:30 p.m. – 1:00 p.m.
Conference Call
Call-In Number (877)718-7057, Pass Code 8098142

Invitees:

- ☒ TJ Kopshy, CVRWQCB
- ☐ Jeff McLain, USFWS
- ☒ Carolyn Yale, EPA
- ☒ Doug DeFlitch, Reclamation
- ☒ Erin Rice, Reclamation
- ☐ Chris Eacock, Reclamation
- ☐ Rhonda Reed, NMFS
- ☐ Gerald Hatler, DFG
- ☐ Erin Strange, NMFS
- ☐ Michelle Workman, USFWS
- ☐ Kim Webb, USFWS
- ☐ Ernie Taylor, DWR
- ☐ Elaina Holburn, Reclamation
- ☐ Jeanne Chilcott, CVRWQCB
- ☐ Stephanie Rickabaugh, USFWS
- ☐ Tom Taylor, Entrix
- ☐ Russ Grimes, ICF
- ☐ Dana White, DWR
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- ☒ Leslie Mirise, NMFS
- ☐ Dave Encinas, DWR
- ☐ Abimael Leon-Cardona, DWR
- ☒ Stephen Lee, Reclamation
- ☒ Michelle Banonis, Reclamation
- ☐ John Battistoni, DFG
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- ☐ Roger Guinee, USFWS
- ☐ Iris Yamagata, DWR
- ☐ Ali Gasdick, Reclamation
- ☐ Shannon Brewer, USFWS
- ☐ Eric Guzman, DFG
- ☐ Laura Meyers, Reclamation
- ☐ Martin Steinpress, B&C
- ☒ Katrina Harrison, Reclamation
- ☐ Seth Gentzler, URS
- ☒ Margarita Gordus, DFG

Flow Status:

- 1550 cfs Friant Dam release; 1412 Gravelly Ford; 1225 Chowchilla Bifurcation Structure; 1195 into Mendota Pool; 965 Mendota Pool release; 700 Sack Dam release; 265 Arroyo Canal demand
- Friant release will decrease to 800 cfs on Friday, May 28
- Decision on June flows pending, waiting formal recommendation from the Restoration Administrator
- Flow changes at Chowchilla Bifurcation Structure were due to Lower San Joaquin Levee District making adjustments to the gates for sediment management
- Inconsistent results from the Dos Palos gage resulted from CDEC still using an outdated rating table when a shift correction was made using a new rating table

Groundwater Monitoring Status:

- Roger Burnett, a drainage expert from Reclamation-TSC, is visiting seepage-prone areas identified by landowners. He is evaluating existing drainage infrastructure, and soil conditions in order to understand current seepage conditions and help develop a plan to move forward with conveying Interim Flows through these areas.
- Monitoring well network now includes 86 wells (including 11 from 2002 Pilot Project)
- 6 real-time groundwater well now reporting

Water Quality Monitoring Status:

- Water quality sampling for next week:
  - Sites: SJR below Friant Dam (Lost Lake Park), Hwy 99, Gravelly Ford, Mendota Dam, Hwy 152, Fremont Ford (Hwy 140), above Merced River confluence (Hills Ferry)
  - Parameters: total suspended solids, nutrients, total organic carbon, dissolved organic carbon, bacteria, anions, metals, pH, conductivity, turbidity, dissolved oxygen, temperature.
  - No pesticides or organics.

Other News:

Next Meeting:

- The next conference call is June 3, 2010 at 12:30 p.m. Call-in number (877)718-7057, passcode 8098142.

San Joaquin River Restoration Program
Weekly Interim Flows 2010, Stream Flow and Water Quality Monitoring Update

Meeting Minutes

June 3, 2010
12:30 p.m. – 1:00 p.m.
Conference Call
Call-In Number (877)718-7057, Pass Code 8098142

Invitees:

- ☐ TJ Kopshy, CVRWQCB
- ☐ Jeff McLain, USFWS
- ☐ Carolyn Yale, EPA
- ☒ Doug DeFlitch, Reclamation
- ☒ Erin Rice, Reclamation
- ☐ Chris Eacock, Reclamation
- ☐ Rhonda Reed, NMFS
- ☐ Gerald Hatler, DFG
- ☐ Erin Strange, NMFS
- ☐ Michelle Workman, USFWS
- ☐ Kim Webb, USFWS
- ☐ Ernie Taylor, DWR
- ☐ Elaina Holburn, Reclamation
- ☐ Jeanne Chilcott, CVRWQCB
- ☐ Stephanie Rickabaugh, USFWS
- ☐ Tom Taylor, Entrix
- ☐ Steve Centerwall, ICF
- ☐ Dana White, DWR
- ☐ Brian Paulson, DWR
- ☐ Elif Fehm-Sullivan, NMFS
- ☒ Leslie Mirise, NMFS
- ☐ Dave Encinas, DWR
- ☒ Abimael Leon-Cardona, DWR
- ☐ Stephen Lee, Reclamation
- ☐ Michelle Banonis, Reclamation
- ☐ John Battistoni, DFG
- ☐ Karen Dulik, DWR
- ☐ Roger Guinee, USFWS
- ☐ Iris Yamagata, DWR
- ☐ Ali Gasdick, Reclamation
- ☐ Shannon Brewer, USFWS
- ☐ Eric Guzman, DFG
- ☐ Laura Meyers, Reclamation
- ☐ Martin Steinpress, B&C
- ☒ Katrina Harrison, Reclamation
- ☐ Seth Gentzler, URS
- ☒ Margarita Gordus, DFG

Flow Status:

- 800 cfs Friant Dam release; 585 Gravelly Ford; 500 San Mateo Ave.; 770 Mendota Pool release; 290 Arroyo Canal demand; 480 Sack Dam
- Friant release was reduced from 1550 to 800 on Friday, May 28
- Friant release will be reduced from 800 to 350 on Tuesday, June 8
- Flow record at the Chowchilla Bifurcation structure from May 25- at least June 3 will be adjusted during the QA/QC process because the pressure transducer was buried with sand and the communication line was also affected. Repairs are underway.

Groundwater Monitoring Status:

- Groundwater levels in Reaches 1 and 2 are falling in response to reduced flows.

- Reclamation downloaded hourly water level data from the data loggers on wells MW-90-97 on Wednesday. These data are the results of the Reach 4A surface-groundwater experiment where flows were reduced below Sack Dam.

Water Quality Monitoring Status:
  - No update this week.

Other News:

Next Meeting:
- The next conference call is June 10, 2010 at 12:30 p.m. Call-in number (877)718-7057, passcode 8098142.

San Joaquin River Restoration Program
Weekly Interim Flows 2010, Stream Flow and Water Quality Monitoring Update

Meeting Minutes

June 10, 2010
12:30 p.m. – 1:00 p.m.
Conference Call
Call-In Number (877)718-7057, Pass Code 8098142

Invitees:

- ☐ TJ Kopshy, CVRWQCB
- ☐ Jeff McLain, USFWS
- ☒ Carolyn Yale, EPA
- ☐ Doug DeFlitch, Reclamation
- ☒ Erin Rice, Reclamation
- ☐ Chris Eacock, Reclamation
- ☐ Rhonda Reed, NMFS
- ☐ Gerald Hatler, DFG
- ☐ Erin Strange, NMFS
- ☐ Michelle Workman, USFWS
- ☐ Kim Webb, USFWS
- ☐ Ernie Taylor, DWR
- ☐ Elaina Holburn, Reclamation
- ☐ Jeanne Chilcott, CVRWQCB
- ☒ Stephanie Rickabaugh, USFWS
- ☐ Tom Taylor, Entrix
- ☐ Steve Centerwall, ICF
- ☐ Dana White, DWR
- ☐ Brian Paulson, DWR
- ☐ Elif Fehm-Sullivan, NMFS
- ☒ Leslie Mirise, NMFS
- ☐ Dave Encinas, DWR
- ☒ Abimael Leon-Cardona, DWR
- ☒ Stephen Lee, Reclamation
- ☒ Michelle Banonis, Reclamation
- ☐ Banessa Espino, DFG
- ☐ Karen Dulik, DWR
- ☐ Roger Guinee, USFWS
- ☐ Iris Yamagata, DWR
- ☐ Ali Gasdick, Reclamation
- ☐ Shannon Brewer, USFWS
- ☐ Eric Guzman, DFG
- ☐ Laura Meyers, Reclamation
- ☐ Martin Steinpress, B&C
- ☐ Katrina Harrison, Reclamation
- ☐ Seth Gentzler, URS
- ☒ Margarita Gordus, DFG

Flow Status:

- 350 cfs Friant Dam release; 518 Gravelly Ford; 461 Chowchilla Bifurcation Structure; 431 San Mateo Ave.; 1009 Mendota Pool release; 600 Arroyo Canal demand; 409 Sack Dam
- Friant release was reduced from 800 to 350 on Tuesday, June 8

Groundwater Monitoring Status:

- Groundwater levels declining in Reach 1-2 in response to flow decreases.
- Groundwater increasing in Reach 3 due to high Mendota Dam releases to meet Arroyo Canal demand
- Monitoring well requests for this fall have been received from:
    - o Reach 4 landowners
    - o Monitoring group
    - o Design teams for significant seepage area

Water Quality Monitoring Status:

- Water quality results released
- More non-detect results
- The State Water Board is working on new standards for pesticides
- Chris Eacock anticipates bringing a panel of experts together to decide what to continue monitoring based on this year's results
- In the future water quality monitoring program should be designed to meet fisheries information needs.

Other News:

- The state water rights permit will be renewed again for WY 2011.
- Due to the PEIS/R delay, a supplemental EA is being written and the draft will be released tomorrow.

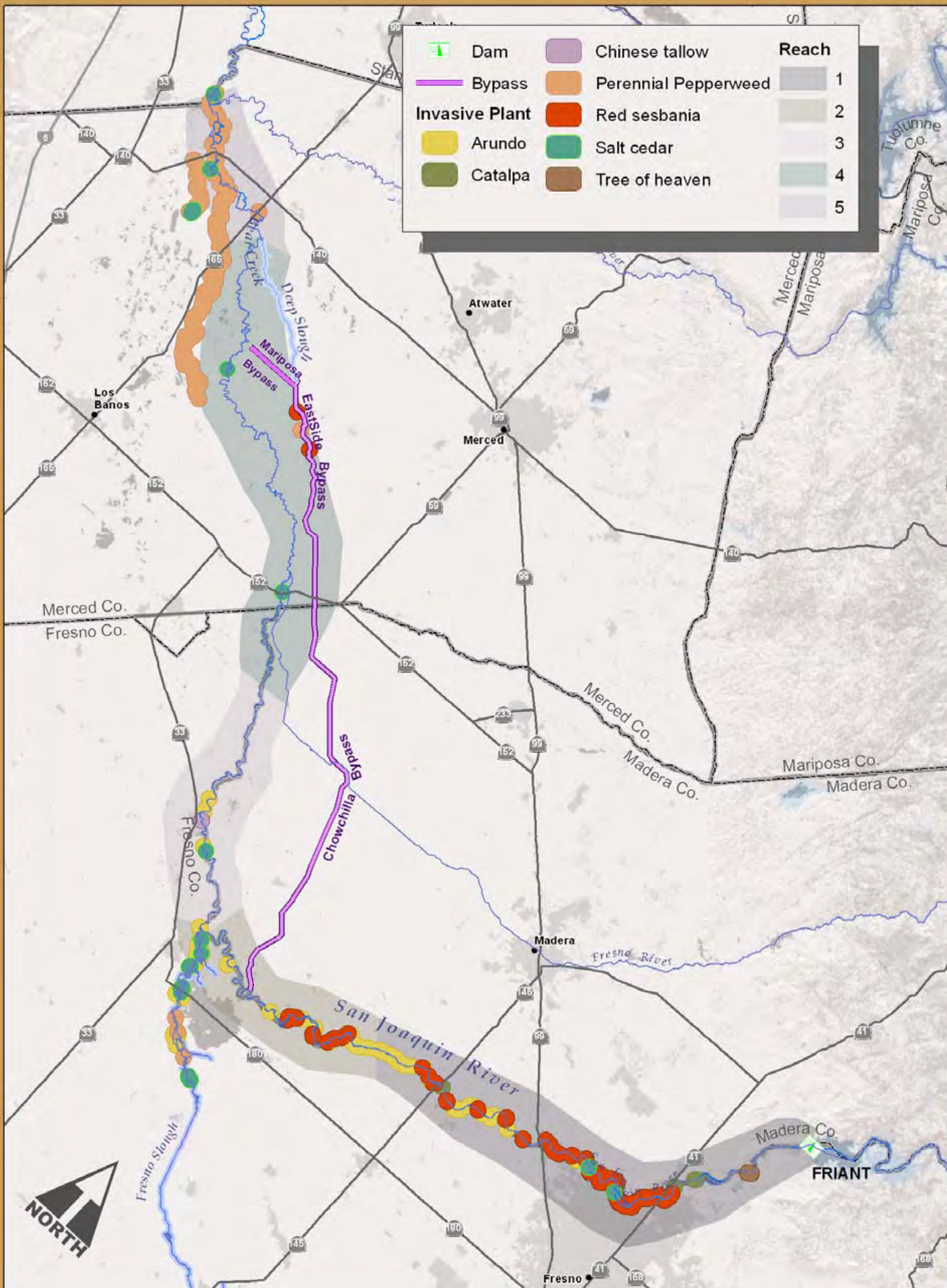
Next Meeting:

- The next conference call is TBD. Email updates will be sent out this summer in lieu of calls.

Attachment 11:

Invasive Vegetation Map

San Joaquin River
Invasive Riparian Plant Species



SJR Invasive Plant - 2008 Source: USBR
Cartographer: Barbara Simpson
Date: June 29, 2010

0 5 10 20
Miles

SAN JOAQUIN RIVER RESTORATION PROGRAM

RECLAMATION
Managing Water in the West

Attachment 12:

WY 2010 Water and Sediment Quality Monitoring Correspondence and Agency Comments

(Condition 22)

United States Department of the Interior

BUREAU OF RECLAMATION
Mid-Pacific Regional Office
2800 Cottage Way
Sacramento, California 95825-1898

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IN REPLY REFER TO:

MP-170
PRJ-1.00

DEC 24 2009

Ms. Victoria Whitney
Deputy Director for Water Rights
Attn: Ms. Kathy Mrowka
State Water Resources Control Board
P.O. Box 2000
Sacramento, CA 95812-2000

Subject: Request for Extension for Submittal of the Water Quality Monitoring Plan Called for in Condition 22 of Order WR 2009-0058-DWR

Dear Ms. Mrowka:

I would like to extend my gratitude to the State Water Resources Control Board (State Board) in their expeditious issuance of Order WR 2009-0058-DWR (Order) for the Bureau of Reclamation, San Joaquin River Restoration Program's Water Year 2010 Interim Flows Project. We began the Interim Flow releases on October 1, 2009 and are working to implement the Interim Flows Project consistent with the Order.

Reclamation has been working diligently to implement Condition 22 of the Order, which generally requires water quality monitoring prior to and during Interim Flows releases and a Water Quality Monitoring Plan to be submitted to the State Board by January 1, 2010. With regard to the water quality monitoring, we have been coordinating with multiple State and Federal agencies and have established an Interim Flows Monitoring Working Group that meets weekly to discuss results of the Interim Flow monitoring activities, including stream flows in specific river reaches, water and sediment quality, flow schedules from Friant Dam, and groundwater monitoring. The working group is comprised of staff from the U.S. Environmental Protection Agency, National Marine Fisheries Service, U.S. Fish and Wildlife Service (FWS), Department of Water Resources (DWR), Department of Fish and Game (DFG), and Central Valley Regional Water Quality Control Board (CVRWQCB). The working group has been valuable as it has increased coordination among the agencies and allowed for quick dissemination of information related to the Interim Flows.

With regard to the water quality monitoring plan, Condition 22 of the Order states the following:

By January 1, 2010, Reclamation shall develop a monitoring plan, acceptable to the Deputy Director for Water Rights, for the releases beginning after February

> *1, 2010. Prior to submitting the plan to the Division of Water Rights, Reclamation shall obtain the written comments of the Central Valley Water Board, U.S. Fish and Wildlife Service, and the California Department of Fish and Game. The plan is subject to review, modification and approval by the Deputy Director for Water Rights.*

A subset of the Interim Flows Monitoring Working Group was formed specifically to guide preparation of the Water Quality Monitoring Plan called for in Condition 22 of the Order. This group includes representatives from FWS, DWR, DFG, and CVRWQCB. A working draft of the Water Quality Monitoring Plan was circulated to the agencies for review and comment on December 8, 2009. Due to the holidays and the State furlough days, some agencies need additional time to review the working draft plan. Additionally, we need additional time to adequately incorporate the comments and complete the plan for submittal to the Deputy Director of Water Rights. Therefore, we would like to request an extension to the date for submitting the Water Quality Monitoring Plan to the Deputy Director. Reclamation can submit the plan on or before January 13, 2010.

We would appreciate a response to this request prior to the January 1, 2010 date stipulated in the Order. Thank you for your continued coordination and assistance in implementing the San Joaquin River Restoration Program's Water Year 2010 Interim Flows Project. Please contact me if you have any questions at 916-978-5455 or jphillips@usbr.gov.

Sincerely,

Jason R. Phillips
Program Manager

cc: Mr. Jeff McLain
U. S. Fish and Wildlife Service
2800 Cottage Way, W-1727
Sacramento, CA 95825

Ms. Karen Dulik
Department of Water Resources
3374 E. Shields Avenue
Fresno, CA 93726

Mr. Gerald Hatler
Department of Fish and Game
1234 East Shaw Avenue
Fresno, CA 93710

Ms. TJ Kopshy
Central Valley Regional Water
Quality Control Board
1685 E Street
Fresno, CA 93706

Gasdick, Alicia E

From: Phillips, Jason R
Sent: Wednesday, January 06, 2010 3:09 PM
To: Banonis, Michelle; Gasdick, Alicia E
Subject: Fw: Request for Extension for Submittal of the Water Quality Monitoring Plan in Order WR 2009-0058-DWR

FYI...

----- Original Message -----
From: Kathy Mrowka <KMROWKA@waterboards.ca.gov>
To: Phillips, Jason R; Colella, Robert F
Cc: ghatler@dfg.ca.gov <ghatler@dfg.ca.gov>; Jeff McLain; Karen Dulik <kdulik@water.ca.gov>; TJ Kopshy <tkopshy@waterboards.ca.gov>
Sent: Wed Jan 06 16:04:57 2010
Subject: Request for Extension for Submittal of the Water Quality Monitoring Plan in Order WR 2009-0058-DWR

Order WR 2009-0058-DWR, condition 22, requires the U.S. Bureau of Reclamation (Reclamation) to submit a water quality monitoring plan by January 1, 2010. The plan must be developed in consultation with the Central Valley Regional Water Quality Control Board, the U.S. Fish and Wildlife Service and the Department of Fish and Game. On December 29, 2009, the Division of Water Rights (Division) received Reclamation's December 24, 2009 request for an extension to January 13, 2010 to submit the plan. The extension was requested due to the holidays and State furlough days, resulting in some of the agencies that are reviewing the plan needing additional time to review the working draft plan. Division staff discussed the request with Victoria Whitney, Deputy Director for Water Rights on January 6, 2010. The request is granted. We will expect the plan on January 13.

Sincerely,

Katherine Mrowka, Chief
Inland Streams Unit
Division of Water Rights

(916) 341-5363
fax (916) 341-5400

United States Department of the Interior

BUREAU OF RECLAMATION
Mid-Pacific Regional Office
2800 Cottage Way
Sacramento, California 95825-1898

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IN REPLY REFER TO:

MP-170
PRJ-1.00

JAN 11 2010

Ms. Victoria Whitney
Deputy Director for Water Rights
Attn: Ms. Kathy Mrowka
State Water Resources Control Board
P.O. Box 2000
Sacramento, CA 95812-2000

Subject: Submittal of the Water Quality Monitoring Plan Called for in Condition 22 of Order WR 2009-0058-DWR

Dear Ms. Whitney:

On October 1, 2009, the State Water Resources Control Board (State Board) issued Order WR 2009-0058-DWR (Order) for the Bureau of Reclamation, San Joaquin River Restoration Program's Water Year 2010 Interim Flows Project. Interim Flow releases began on October 1, 2009, and Reclamation is working to implement all conditions of the Order.

Condition 22 of the Order states the following:

> *By January 1, 2010, Reclamation shall develop a monitoring plan, acceptable to the Deputy Director for Water Rights, for the releases beginning after February 1, 2010. Prior to submitting the plan to the Division of Water Rights, Reclamation shall obtain the written comments of the Central Valley Water Board, U.S. Fish and Wildlife Service, and the California Department of Fish and Game. The plan is subject to review, modification and approval by the Deputy Director for Water Rights.*

On December 24, 2009, Reclamation sent an extension request to extend the Water Quality Monitoring Plan's required submittal date of January 1, 2010, to a proposed date of January 13, 2010. This request was approved through the State Board via an e-mail from Ms. Kathy Mrowka, Chief of the Inland Streams Unit, Division of Water Rights, on January 6, 2010.

We are including, the following enclosures to this letter:

- San Joaquin River Restoration Program's 2009 – 2013 Interim Flows Release Program Water Quality Monitoring Plan (Plan).

- Written comments from the U.S. Fish and Wildlife Service (FWS), the California Department of Fish and Game (DFG), and the Central Valley Regional Water Quality Board (CVRWQB).
- Reclamation's December 24, 2009, letter to the State Board requesting an extension to the date for submitting the Plan.
- January 6, 2010 e-mail correspondence from Ms. Kathy Mrowka to Jason Phillips granting extension request for the Plan submittal.

The Plan should be viewed as a "living document" and modifications may be required as we improve our understanding of the San Joaquin River system. We will continue holding weekly meetings with the California Department of Water Resources, the National Marine Fisheries Service, the U.S. Environmental Protection Agency, DFG, CVRWQB, and FWS during the Water Year 2010 Interim Flow releases in order to ensure the most effective and efficient water and sediment quality data collection is undertaken and to adapt to real-time river conditions.

Thank you for your continued coordination and assistance in implementing the San Joaquin River Restoration Program's Water Year 2010 Interim Flows Project. Please contact me if you have any questions at 916-978-5455 or jphillips@usbr.gov.

Sincerely,

Jason R. Phillips
Program Manager

Enclosures - 3

cc: Mr. Jeff McLain
U. S. Fish and Wildlife Service
2800 Cottage Way, W-1727
Sacramento, CA 95825
(w/o encl)

Mr. Gerald Hatler
Department of Fish and Game
1234 East Shaw Avenue
Fresno, CA 93710
(w/o encl)

Ms. Karen Dulik
Department of Water Resources
3374 E. Shields Avenue
Fresno, CA 93726
(w/o encl)

Ms. TJ Kopshy
Central Valley Regional Water
Quality Control Board
1685 E Street
Fresno, CA 93706
(w/o encl)

bc: MP-460 (w/encl)

2009 – 2013 Interim Flow Release Program, Water Quality Monitoring Plan

SAN JOAQUIN RIVER
RESTORATION PROGRAM

January 8, 2010

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List of Abbreviations and Acronyms

ºC	degrees Celsius
ºF	degrees Fahrenheit
COC	chain of custody
CVP	Central Valley Project
RWQCB	Central Valley Regional Water Quality Board
Delta	Sacramento-San Joaquin Delta
DFG	California Department of Fish and Game
DMO	data management organization
DO	dissolved oxygen
DWR	California Department of Water Resources
SC	Specific conductance
mg/L	milligrams per liter
NRDC	Natural Resources Defense Council
PEIS/R	Program Environmental Impact Statement/Report
ppb	parts per billion
ppm	parts per million
QA	Quality Assurance
QC	Quality Control
Reclamation	U.S. Department of the Interior, Bureau of Reclamation
SJRRP	San Joaquin River Restoration Program
SOP	standard operating procedure
SWAMP	Surface Water Ambient Monitoring Program
TM	Technical Memorandum
USGS	U.S. Geological Survey
USFWS	U.S. Fish and Wildlife Service

1.0 Summary

The purpose of this document is to describe a program to monitor water quality changes that may occur with the 2010 – 2013 Interim Flow Release Program of the San Joaquin River Restoration Program (SJRRP). This document was prepared by the Interagency Water Quality Monitoring Workgroup[1]. The San Joaquin River Restoration 2009-2013 Interim Flow Release Program Water Quality Monitoring Plan (Monitoring Plan), as proposed, will be conducted by staff of SJRRP Implementing Agencies and will complement independent monitoring by other Federal, State, and private agencies.

This Monitoring Plan is intended to measure the quality of water as it travels from Friant Dam down the San Joaquin River. The flow modifications at Friant Dam are specified in the Stipulation of Settlement[2]. The implementation of the Settlement is authorized under Section 3406(c)(1) of the Central Valley Project Improvement Act (CVPIA) Title 34 (Public Law 102-575) and the San Joaquin River Restoration Settlement Act, included in Public Law 111-11. Publicly available, high quality data are critical for demonstrating compliance with the provisions of the Settlement and determining the impacts that Interim Flows may have on water quality conditions in the river between Friant Dam and the confluence with the Merced River.

The California State Water Resources Control Board issued a Water Rights Order[3] (Order) that authorizes changes to water rights permits needed to implement the Interim Flow Release Program. The Order requires monitoring of water quality and sediments at several locations along the river. In June 2009, a draft Fish Management Plan was prepared by the Technical Workgroup[4] that included many recommendations for monitoring water quality for (1) cold, freshwater habitat, (2) migration of aquatic organisms, and (3) spawning, reproduction, and early development. This Monitoring Plan has been designed to meet the requirements of the Water Rights Order and compliment the adaptive management design of the Fish Management Plan.

Several sampling techniques will be used to collect samples of water, including real-time, grab, and composite using autosamplers. The core of the program will be a series of sensors along the river that will make continuous measurements of physical conditions, including flow, depth, temperature, specific conductance (salinity), pH, dissolved oxygen (DO), turbidity, and chlorophyll. The data will be averaged every 15 minutes and then sent via satellite to the Internet as preliminary data. Raw data will be posted by the California Data Exchange Center

---

[1] U.S. Department of the Interior, Bureau of Reclamation (Reclamation), Fish and Wildlife Service (FWS), the California Departments of Water Resources (DWR) and Fish and Game (DFG), and the California Environmental Protection Agency.

[2] Natural Resources Defense Council, et al. v. Kirk Rodgers, as Director of the Mid-Pacific Region of the U. S. Bureau of Reclamation, et al. September 13, 2006. Stipulation of Settlement. U. S. District Court, Eastern District of California (Sacramento Division).

[3] California Environmental Protection Agency, State Water Resources Control Board, September 30, 2009. Order WR 2009-0058-DWR Temporary transfer of Water and Change Pursuant to Water Code Sections 1725 and 1707.

[4] SJRRP, June 2009. Draft Fisheries Management Plan: A Framework for Adaptive Management in the San Joaquin River Restoration Program

(www.cdec.water.ca.gov) and linked to the SJRRP website. Water and bed sediment monitoring will be conducted as required under the Water Rights Order. The location and parameters to be tested are listed in Tables 2 and 3 of this Monitoring Plan.

In addition, water samples will be collected at other places of importance for fish passage and survival. The location and frequency of sampling and analytical parameters will be developed with the Fisheries Management Work Group and will be modified as needed. The Fisheries Management Work Group is a key component of the SJRRP, consisting of a multi-agency group of fisheries experts. The recommended locations and parameters are listed in Appendix B of this plan.

Verified data will be compiled and published on-line by an independent data management organization. Annual synthesis reports will be written by staff of the agencies and contractors collecting the data for this Monitoring Plan.

2.0 Title

San Joaquin River Restoration Program

2010 – 2013 Interim Flow Release Water Quality Monitoring Plan

3.0 Background

Friant Dam is located on the San Joaquin River near Fresno, California. The United States Bureau of Reclamation (Reclamation) has diverted water from the river below the dam since 1952 to irrigate more than a million acres of farmland that produce a variety of crops worth over $2.5 billion annually. Numerous communities depend on Friant water, such as the City of Fresno, and it is the sole source of water for the small communities of Friant, Orange Cove, Lindsay, Strathmore and Terra Bella. These diversions have removed most of the water from the river, and many times the river has been dry at Gravelly Ford, about 40 miles below the dam.

Degraded water quality in various segments of the San Joaquin River has been a serious problem for several decades due to low river flows and discharges from agricultural areas, wildlife refuges, and municipal waste water treatment plants. Degraded water quality has been identified as a potential limiting factor for Chinook salmon and other native fishes. Constituents such as pesticides and other urban and agricultural wastes may affect water quality parameters such as DO and turbidity, creating habitat unsuitable for Chinook salmon.

In 1998, the Central Valley Regional Water Quality Control Board (RWQCB) adopted a Water Quality Control Plan[5] for the Sacramento and San Joaquin River basins (Basin Plan) as the regulatory reference for meeting Federal and State requirements. Specific water quality standards associated with the lower San Joaquin River apply to boron, molybdenum, selenium, dissolved oxygen, pH, pesticides, and salinity, as measured at Vernalis and other locations along the San Joaquin River as it enters the Delta. One of the high priority issues of the Basin Plan review is the regulatory guidance for total maximum daily load (TMDL) standards at locations along the San Joaquin River. Mud and Salt Sloughs, which flow into the San Joaquin River upstream from the Merced River, and the San Joaquin River from Mendota Pool downstream to Vernalis are listed as impaired water bodies.[6]

In 1988, a coalition of environmental groups, led by the Natural Resources Defense Council (NRDC), filed a lawsuit challenging the renewal of long-term water service contracts between the United States and the Central Valley Project (CVP) Friant Division contractors. After more than 18 years of litigation of this lawsuit, known as NRDC et al. v. Kirk Rodgers et al., a settlement (Settlement) was reached[7]. On September 13, 2006, the Settling Parties, including NRDC, Friant Water Users Authority (FWUA), and the U.S. Departments of the Interior and Commerce, agreed on the terms and conditions of the Settlement, which was subsequently approved by the U.S. Eastern District Court of California on October 23, 2006. The planning and environmental review necessary to implement the Settlement is authorized under Section 3406(c)(1) of the Central Valley Project Improvement Act (CVPIA) Title 34, (Public Law 102-575) and the San Joaquin River Restoration Settlement Act, included in Public Law 111-11. The Secretary of the Interior is authorized and directed to implement the terms and conditions of the Settlement through the Act.

The SJRRP is a comprehensive long-term effort to restore flows in the San Joaquin River from Friant Dam to the confluence of the Merced River and restore a self-sustaining Chinook salmon fishery in the river while reducing or avoiding adverse water supply from the restoration flows. Staff from Reclamation, the California Department of Water resources (DWR), the U.S. Fish and Wildlife Service (USFWS), the National Marine Fisheries Service (NMFS), and the California Department of Fish and Game (DFG), will implement the Settlement.

The Settlement has two primary goals:

- Restoration Goal – To restore and maintain fish populations in “good condition” in the main stem San Joaquin River below Friant Dam to the confluence of the Merced River, including naturally reproducing and self-sustaining populations of salmon and other fish.

---

[5] California Regional Water Quality Control Board, Central Valley Region, Revised February 2007. The Water Quality Control Plan (Basin Plan) for the Central Valley Region, Fourth Edition. The Sacramento River Basin and the San Joaquin River Basin.

[6] SJRRP, October 2007. Draft Purpose and Need Statement.

[7] Natural Resources Defense Council, et al. v. Kirk Rodgers, as Director of the Mid-Pacific Region of the U. S. Bureau of Reclamation, et al. September 13, 2006. Stipulation of Settlement. U. S. District Court, Eastern District of California (Sacramento Division).

- Water Management Goal – To reduce or avoid adverse water supply impacts on all of the Friant Division long-term contractors that may result from the Interim Flows and Restoration Flows provided for in the Settlement.

Increasing flows in the San Joaquin River from Friant Dam to the Merced River and downstream reaches has the potential to improve water quality conditions under various hydrologic conditions in some reaches of the river. Opportunities to improve water quality in the San Joaquin River will be identified and evaluated to the extent that they are consistent with actions that address the Restoration and Water Management goals.

Degraded water quality has been identified as a potential limiting factor for Chinook salmon and other native fishes. Constituents such as pesticides and other urban and agricultural wastes may affect water quality parameters such as DO and turbidity, creating habitat unsuitable for Chinook salmon. Sources of adverse water-quality conditions and whether or not discharge conditions will improve water quality are unknown. Evaluating and taking management actions for these conditions may be necessary to successfully meet the Restoration Goal. All life stages of Chinook salmon could be affected.

It is expected that the monitoring framework described below for monitoring for physical habitat parameters will enable the collection of information required for real-time decision making, as well as to collect information to evaluate the success of the SJRRP and its objectives.

Paragraph 18 of the Settlement describes the roles and responsibilities of the Restoration Administrator (RA) and the Technical Advisory Committee (TAC). The Implementing Agencies responsible for monitoring are a part of the TAC as either non-voting members (DFG and DWR) or Liaisons (Reclamation, NMFS, and USFWS). To facilitate real-time flow decisions the Implementing Agencies will be available to the TAC to compile and assess current information regarding water operations, Chinook salmon and other fish condition, such as stages of reproductive development, geographic distribution, relative abundance, and physical habitat conditions.

The SJRRP will coordinate with land owners, irrigation districts, and other relevant entities to identify water quality improvement opportunities associated with implementing the SJRRP.

3.1 Beneficial Uses

The data collection and analysis performed for the release of the Interim Flows Program has the potential to provide a broad range of beneficial uses including, but not limited to, fisheries. Fisheries resources in the area associated with existing native species and proposed reintroduction of Chinook salmon stand to benefit from the knowledge of general trends in water quality, flow and temperature. Specific information has the ability to tell fisheries experts what environmental conditions are present and allow them to make more informed decisions to manage fish species.

3.2 Study Area

The Study Area for this Monitoring Plan (Figure 1) encompasses over 152 miles of the San Joaquin River from Millerton Lake to the Merced River confluence. This Monitoring Plan will also incorporate data from other agencies involved with planning and implementation efforts along the San Joaquin River to evaluate regional effects of the restoration effort.

The river is divided in the five reaches between Friant Dam and the confluence with the Merced River (Figures 4 to 8) with different hydrologic features:

Reach 1	River Miles 268 – 225	Friant Dam to Gravelly Ford
Reach 2	River Miles 225 – 205	Gravelly Ford to Mendota Dam
Reach 3	River Miles 205 – 182	Mendota Dam to Sack Dam
Reach 4	River Miles 182 – 136	Sack Dam to Bear Creek
Reach 5	River Miles 136 – 118	Bear Creek to Merced River

Figure 2 is a diagram that shows the locations of the water monitoring stations with respect to major tributaries to and diversions from the San Joaquin River. The locations of water quality monitoring stations specified in the Water Rights Order are summarized in Table 2. Bed sediment monitoring sites, also specified in the Water Rights Order, are listed in Table 3.

Figure 3 is a diagram showing the location of real-time monitoring sites along the river listed in Table 1.

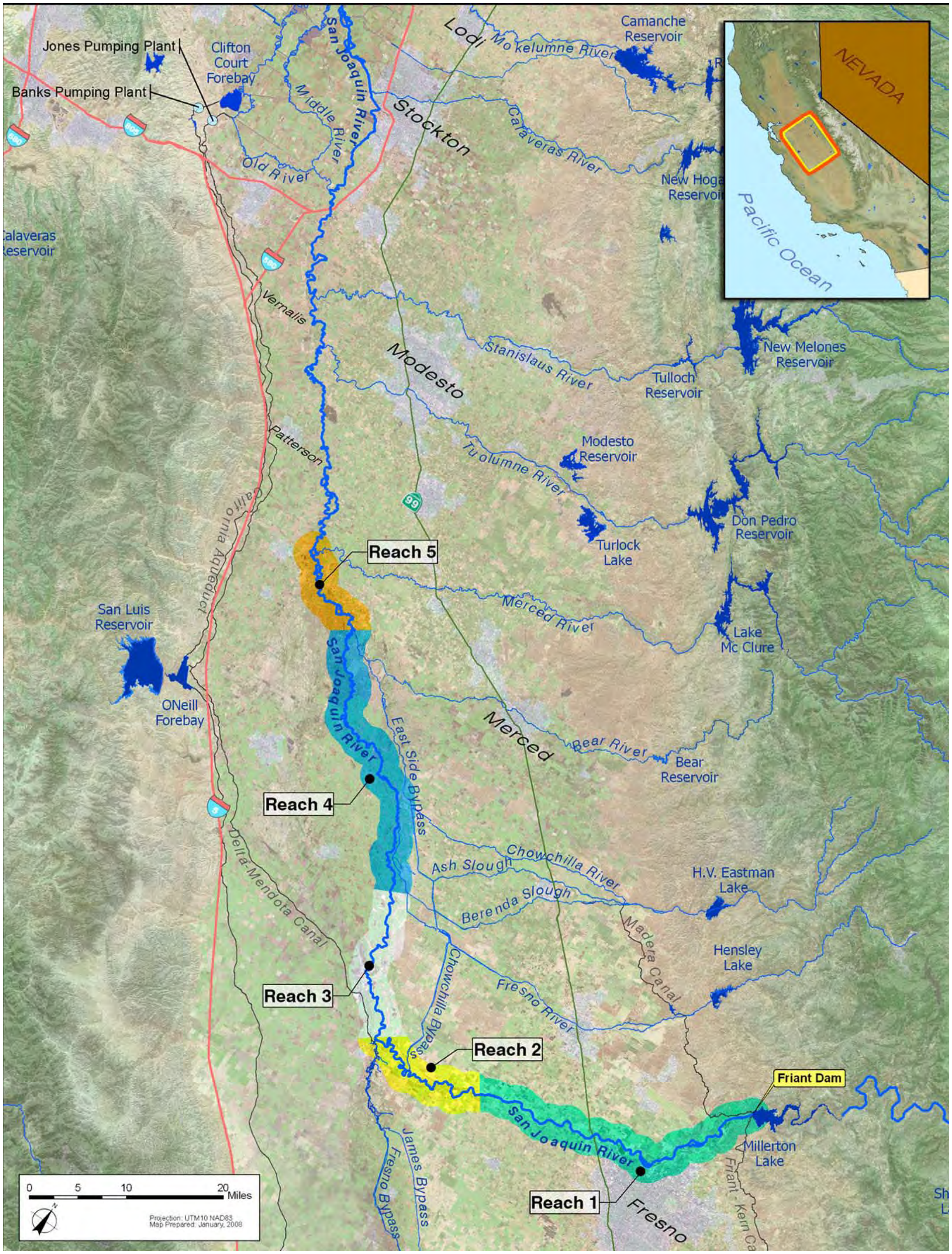

Figure 1.
Location Map – San Joaquin River Restoration Program Showing Five Reaches of the Study Area Between Friant Dam and the Confluence with the Merced River

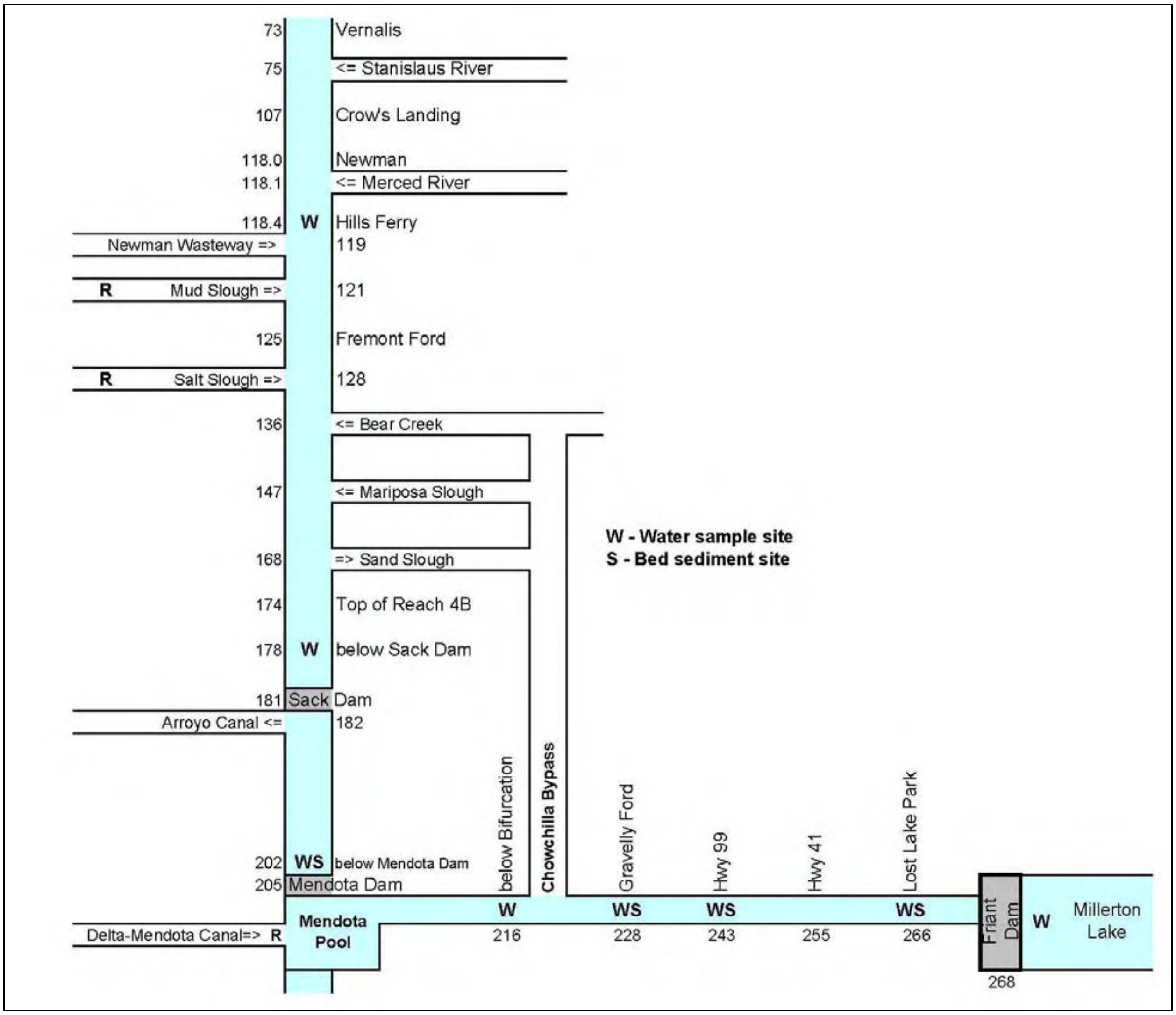

Figure 2.
Diagram of the San Joaquin River from Friant Dam to Below the Merced River Showing Water and Sediment Monitoring Sites Specified in the Water Rights Order

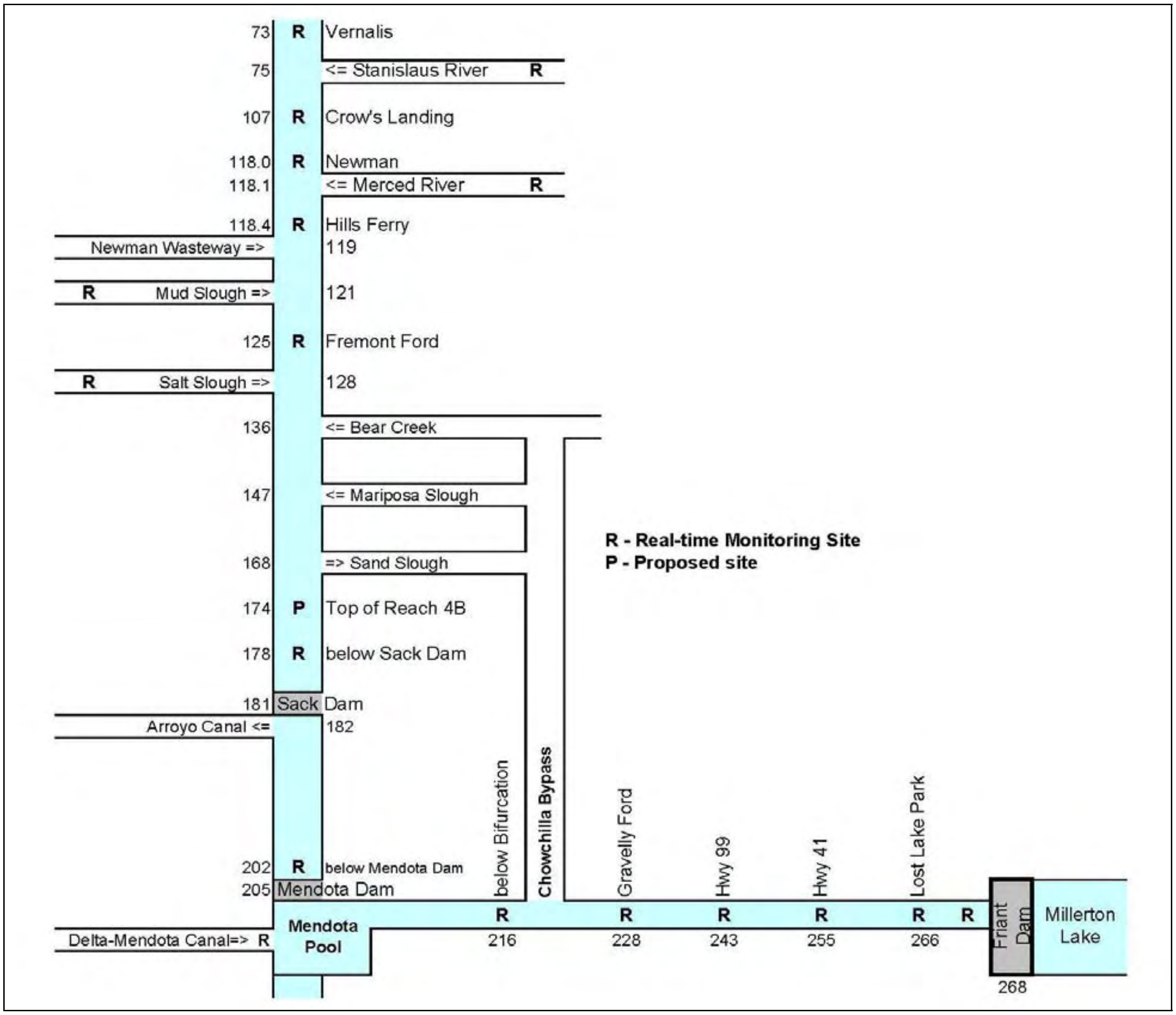

Figure 3.
Diagram of the San Joaquin River from Friant Dam to Below the Merced River Showing Real-time Monitoring Sites

Table 1.
Real-Time Water Quality Monitoring Sites

Location	Responsible Agency	CDEC	Parameters	Frequency	Remarks
Millerton Lake	Reclamation (Friant)	MIL	Temperature, DO	Monthly	Grab sample
San Joaquin River at Friant Dam	Reclamation (Friant)	P	Flow, physical	Continuous	Multiple parameter sonde
San Joaquin River below Friant Dam (Lost Lake Park)	USGS	SJF	Flow	Continuous	
San Joaquin River at Highway 41	Reclamation (Friant)	H41	Stage	Continuous	
San Joaquin River at Highway 99					
San Joaquin River at Gravelly Ford	Reclamation (Friant)	GRF	Flow, physical	Continuous	Multiple parameter sonde
San Joaquin River below bifurcation	Reclamation (Friant)	SJB	Flow, physical	Continuous	Multiple parameter sonde
Delta-Mendota Canal Check 21	Reclamation (CVO)	DM3	EC	Continuous	
San Joaquin River near Mendota (below Mendota Dam)	USGS	MEN	Flow	Continuous	
San Joaquin River below Sack Dam	DWR	P	Flow, physical	Continuous*	Multiple parameter sonde*
San Joaquin River at top of Reach 4B	TBD	P	Flow, physical	Continuous*	Multiple parameter sonde*
San Joaquin River at Fremont Ford Bridge	USGS	FFB	Flow, physical	Continuous	Multiple parameter sonde
San Joaquin River at Hills Ferry	USGS	P	Flow, physical	Continuous*	Multiple parameter sonde
San Joaquin River near Newman (below Merced River)	USGS	NEW	Flow	Continuous	
San Joaquin River near Crows Landing	USGS	SCL	Flow, physical	Continuous	Grassland Bypass Project Station N

Notes:

P – Proposed sites, scheduled to operate in 2010

TBD – Agency to be determined

Physical parameters include specific conductance, temperature, pH, dissolved oxygen, turbidity, and/or chlorophyll

Parameters may be adjusted based on results of 2009 Interim Flow monitoring.

Table 2.
Water Quality Monitoring Sites Specified in the Water Rights Order

Monitoring Site	Reach	TSS	Nutrients	TOC/DOC	Bacteria	Trace Elements	Pesticides	Bed Sediments
Millerton Lake	1A	W						
SJR just below Friant Dam	1A	W	W	W	W	W	W	1P
SJR near HWY 99	1A	W	W	W	W	W	W	1P
SJR at Gravelly Ford	2A	W	W	W	W	W	W	1P
SJR below Bifurcation	2B	W						
SJR near Mendota	3	W	W	W	W	W	W	1P
SJR below Sack Dam	4A	W						
SJR at Fremont Ford	5	W						
SJR at Hills Ferry	5	W						

Sampling frequency:
Water: Twice weekly, October 1 - 14, 2009; weekly, October 15 - November 20,2009
Sediment: Once following interim flows (December 2009)

Table 3.
Bed Sediment Monitoring Sites Specified in the Water Rights Order

Monitoring Site	Reach	CDEC	Flow	Temperature	pH	Dissolved Oxygen	Chlorophyll	Turbidity	EC
Millerton Lake	1A	MIL	C						
SJR just below Friant Dam	1A	P	C	C	C	C	C	C	C
SJR at HWY 41	1A	H41	C						
SJR near HWY 99	1A	DNB	C	P	P	P	P	P	P
SJR at Gravelly Ford	2A	GRF	C	C	C	C	C	C	C
SJR below Bifurcation	2B	SJB	C	C	C	C	C	C	C
SJR near Mendota	3	MEN	C						
SJR below Sack Dam	4A	P	P	P	P	P	P	P	P
SJR at Fremont Ford	5	FFB	C	C					C
SJR at Hills Ferry	5	P	C	C	P	P	P	P	C
SJR at Crows Landing	5	SCL	C	C					C

C=continuous monitoring using YSI 6600 multiparameter sondes
P=pending installation of sondes

4.0 Study Methods and Materials

4.1 Monitoring Design

The objectives of this Monitoring Plan follow the regulatory requirements set forth in the Water Rights Order WR 2009-0058-DWR (Order), which discusses the need for water quality monitoring and Monitoring Plan development (See Appendix B). The primary objective of this Monitoring Plan is to obtain high quality data to support the SJRRP and to meet the terms of the Order.

Reclamation will be responsible for the purchase and use of all materials associated with this Monitoring Plan. Most sampling equipment will be owned and operated by Reclamation staff. Reclamation's Quality Assurance Officer will be responsible for training of all field staff and verification of methods and results.

The Monitoring Plan provided in this document is compliant with the Surface Water Ambient Monitoring Quality Assurance Monitoring Program (SWAMP) guidelines.

4.2 Adaptation to Real-Time Conditions

Given the uncertainty associated with restoration of Chinook salmon and native fish populations to the San Joaquin River, and complexity of the SJRRP, a real-time management program is needed to ensure the SJRRP can be flexible, adjusting as new information becomes available. The response of reestablished Chinook salmon and other fishes to physical factors such as temperature, streamflow, climate change, and the impacts of various limiting factors is unknown.[8]

Real-time management will allow decision makers to take advantage of a variety of strategies and techniques that are adjusted, refined, and/or modified based on an improved understanding of system dynamics. SJRRP restoration actions are restricted to the Restoration Area, thus limiting the application of real-time management on an ecosystem-wide basis. Thorough monitoring and evaluation of real-time management actions are critical to successful learning and resolution of scientific uncertainties. Results of monitoring and evaluation will be used to redefine problems, reexamine goals, and/or refine conceptual and quantitative models, to ensure efficient learning and adaptation of management techniques.

By using real-time management, the SSJRP will respond and change the implementation and management strategy as new knowledge is gained. This real-time management approach will (1) maximize the likelihood of success of actions, (2) increase learning opportunities, (3) identify data needs and reduce uncertainties, (4) use the best available information to provide technical

[8] SJRRP, June 2009. Draft Fisheries Management Plan, Page 1-3

support and increase the confidence in future decisions and recommendations, and (5) prioritize management actions.

4.3 Indicators and Measurement Parameters

The following sections describe the parameters for real-time and laboratory measurement of water quality, as well as methods for quality control, data management, and data reporting.

4.3.1 Real-Time Water Quality Monitoring Parameters

Parameters that will be monitored on a real-time basis at the stations discussed above for this Monitoring Plan are described below. Methods of measurement, along with range, resolution, and accuracy of specified sensors are provided in Table 2.

Temperature

Temperature is a physical property of a system measured in degrees Fahrenheit (ºF) or Celsius (ºC). Temperature is a critical parameter for various life stages of salmonids.

Salinity

Salinity is a measure of dissolved elements in water. It is the sum weight of many different elements within a given volume of water, reported in milligrams per liter (mg/L) or parts per million (ppm). Salinity is an ecological factor of considerable importance, influencing the types of organisms, such as plants and fish, that live and grow in a body of water. Salinity can be estimated by measuring the specific conductance (SC) of water.

Dissolved Oxygen

In aquatic environments, DO is a measure of the amount of oxygen (O_2) dissolved in water. Super saturation can sometimes be harmful for organisms and can cause decompression sickness. Lack of dissolved oxygen is also harmful. DO is measured in standard solution units such as millimoles O_2 per liter (mmol/L) or milligrams O_2.

pH

The property of pH is a measure of the acidity or alkalinity of a solution given by the concentration of hydrogen ions. Values of pH in water are commonly in the range 0 to 14 units. Aqueous solutions at 25°C with a pH of less than 7 are considered acidic, while those with a pH of greater than 7 are considered basic (alkaline). When a pH level is 7.0, it is defined as “neutral” at 25°C. The pH reading of a solution is usually obtained by comparing unknown solutions to those of known pH.

Turbidity

Turbidity is the cloudiness or haziness of a fluid, caused by individual particles (suspended solids) that are generally invisible to the naked eye, similar to smoke in air. The measurement of turbidity is a key test of water quality.

Chlorophyll

Chlorophyll, in various forms, is bound within the living cells of algae and other phytoplankton found in surface water. Chlorophyll is a key biochemical component in the molecular apparatus that is responsible for photosynthesis, the critical process in which the energy from sunlight is used to produce life-sustaining oxygen. In the photosynthetic reaction, carbon dioxide is reduced by water, and chlorophyll assists this transfer.

Algae refer to simple aquatic organisms, such as seaweed, pond scum, and plankton, that are plantlike and contain chlorophyll. For *in-situ* monitoring, the measured parameter is the chlorophyll contained within the phytoplankton.

Monitoring chlorophyll levels is a direct way of tracking algal growth as an indicator organism for the health of a particular body of water.

When algae populations bloom, then crash and die in response to changing environmental conditions, they deplete DO levels – a primary cause of most fish kills. High levels of nitrogen and phosphorus can be indicators of pollution from manmade sources, such as septic system leakage, poorly functioning wastewater treatment plants, or fertilizer runoff. Thus, chlorophyll measurement can be used as an indirect indicator of nutrient levels.

The most widely used measure of phytoplankton biomass is chlorophyll a. It has several advantages as a measure of phytoplankton biomass, including (1) the measurement is relatively simple and direct, (2) it integrates cell types and ages, (3) it accounts to some extent for cell viability, and (4) it can be quantitatively coupled to important optical characteristics of water.

**Table 4.
Real-Time Monitoring Physical Parameters**

Temperature	
Method	Digital thermometer (YSI 6600 sonde)
Range	-5 to +45 ºC
Resolution	0.01 ºC
Accuracy	± 0.15 ºC
Salinity – Specific Conductance	
Method	Conductivity meter (YSI 6600 sonde)
Range	0 to 100 mS/cm
Resolution	0.001 to 0.1 mS/cm (range-dependent)
Accuracy	± 0.5%, ±0.1 mS/cm
Dissolved Oxygen	
Method	Digital probe (YSI 6600 sonde)
Range	0 to 50 mg/L
Resolution	0.01 mg/L
Accuracy	0 to 20 mg/L: ± 2% of reading or 0.2% mg/L 20 to 50 mg/L%: ± 6% of reading
pH	
Method	Digital probe (YSI 6600 sonde)
Range	0 to 14 units
Resolution	0.01 unit
Accuracy	± 0.2% unit
Turbidity	
Method	Turbidity meter (YSI 6600 sonde)
Range	0 to 1,000 NTU
Resolution	0.1 NTU
Accuracy	± 5% of reading or 2 NTU
Depth	200 feet
Chlorophyll	
Method	Digital sensor (YSI 6600 sonde)
Range	0 to 400 µg/L
Resolution	0.1 µg/L Chlorophyll; 0.1% FS
Depth	200 feet

Key:
ºC = degrees Celsius
FS = fluorescence
µg/L = micrograms per liter
mg/L = milligrams per liter
mS/cm = milliSiemens per centimeter
NTU = Nephelometric turbidity unit

4.3.2 Sampling For Laboratory Analyses of Water Quality

The following sections describe constituents for laboratory analyses of water quality, as well as methods for water quality sampling and chain of custody documentation. Reclamation will execute contracts with select laboratories that have met its standards of quality assurance and data validity.

Constituents

The complete list of constituents to be measured at various sites along the SJRRP study area will be determined as needed by relevant scientific personnel for fish and water management purposes. Parameters may include selenium, mercury, boron, nutrients, and other compounds that cannot be measured with field sensors.

Sampling Methods

Grab samples may be collected using a stainless steel sampling device. This device is a cage on a pole that holds the sampling bottle. Grab samples may also be collected from the stream bank directly into sample bottles or into a churn-splitter. This technique is for samples collected weekly or less frequently. Reclamation will specify the sampling details in a Quality Assurance Project Plan to be prepared for the SJRRP. Details will include sample volume, correct container, preservative, and handling. Some samples will require immediate delivery to the analytical lab. Reclamation will train field staff to collect samples.

Depth/width integrated samples will be collected where parameters may not be evenly mixed across the river channel. This method involves collecting samples at regular intervals across the channel. Reclamation will train field staff to conduct this sampling method.

Time composite samples, if needed, will be collected using an autosampler. Daily composite samples typically consist of two to eight subsamples taken per day and mixed into one sample. Weekly composite samples will consist of seven consecutive daily subsamples mixed into one sample. Reclamation and the Central Valley Regional Water Quality Control Board (Central Valley RWQCB) currently use autosamplers to collect daily composite samples from the Delta-Mendota Canal, San Luis Drain, and San Joaquin River at Crows Landing. Reclamation staff will be available to deploy and operate autosamplers as needed to support the SJRRP.

Chain of Custody Documentation

Chain of custody (COC) documentation will be initiated during sample collection for all matrices and maintained throughout analytical and storage processes. All individuals transferring and receiving samples will sign, date, and record the time on the COC that the samples are transferred. Each agency will follow its established COC procedures and use various agency and laboratory COC records. Reclamation will train field staff to complete COC forms.

Laboratory COC procedures are described in each laboratory's Quality Assurance Program Manual, which is kept on file with the Quality Control Officer (QCO). Laboratories must receive the COC documentation submitted with each batch of samples and sign, date, and record the time the samples are transferred. Laboratories will also note any sample discrepancies (e.g., labeling, breakage). This documentation must be maintained for a minimum of 5 years. After generating the laboratory data report for the client, samples will be stored for a minimum of 30 days in a secured area prior to disposal.

4.4 Data Analysis and Assessment

The SJRRP Streamflow and Water Quality Monitoring Subgroup will have regular conference calls to discuss updates and data related to the release of flows from Friant Dam and the related information collected from the San Joaquin River as water moves through the existing channel. Compilations of data will be reviewed by the Subgroup to identify trends and justify changes to the Monitoring Plan and implement real-time management strategies.

An annual meeting will occur with Interagency staff to review collected water quality monitoring data, to analyze the general trends, and to write an annual report that summarizes the findings.

4.5 Data Collection and Frequency of Sampling

Interim Flow water will be tracked and sampled at several sites along the river as specified in the Water Rights Order and for the benefit of fishery management. The foundation of this Monitoring Plan will be a series of sensors located along the study area that will provide real-time measurements of physical conditions (Table 1). The sondes will measure stage (depth), flow, specific conductance, temperature, dissolved oxygen, and pH. The locations of the sensors are listed in Table 1 and are shown on Figure 3.

Routine samples of water will be collected at the sites listed in Table 2 for analyses of various parameters required by the Water Rights Order. Other sites will be added to support fish management research. The frequency of sampling and analytical parameters will be is based on initial findings from the 2009 Interim Flow Water Quality Monitoring, the requirements of the Order, and recommendations from the SJRRP Streamflow and Water Quality Monitoring Subgroup.

Additional water quality monitoring locations may be warranted as new site conditions dictate. Therefore, this list may be revised based upon future data needs.

4.6 Spatial and Temporal Scale

4.6.1 Reach 1

Tables 5, 6, and 7 describe locations for water quality monitoring within Reach 1, which are shown in Figure 4.

Table 5.
San Joaquin River at Friant Dam

Description	The station is located at the base of Friant Dam.
Purpose	To measure the initial volume, temperature, and quality of water released from the dam into the river for riparian diversions and the SJRRP.
Responsible Agency	Reclamation, Friant Dam office, is responsible for operation of the dam and will maintain this water quality station.
Existing Equipment	Stage recorder, multi-parameter sonde, linked to CDEC via satellite.

Note: The sonde will be installed end of the wall between the river valves and the spillway.

Table 6.
San Joaquin River below Friant Dam (Lost Lake Park)

Description	The station will be located near the existing USGS flow monitoring site in Lost Lake Park.
Purpose	To measure the quality of water released from the dam into the river for riparian diversions and the SJRRP.
Responsible Agency	Reclamation, Friant Dam office, will maintain this monitoring station. USGS will continue to measure flow. Reclamation, Environmental Monitoring Branch (MP-157), will collect water samples; if needed, an autosampler could be operated here.
Existing Equipment	Stage recorder, linked to CDEC via satellite.
Revision	Add autosampler, multiple parameter sonde.

Table 7.
San Joaquin River at Highway 99 (Camp Pashayan)

Description	This site is located about 25 miles downstream from Friant Dam, near several golf courses.
Purpose	To measure the quality of water in the river near possible sources of nutrient and pesticide contamination
Responsible Agency	Reclamation, MP-157
Existing Equipment	None
Modifications	Get permission to access the river through Camp Pashayan

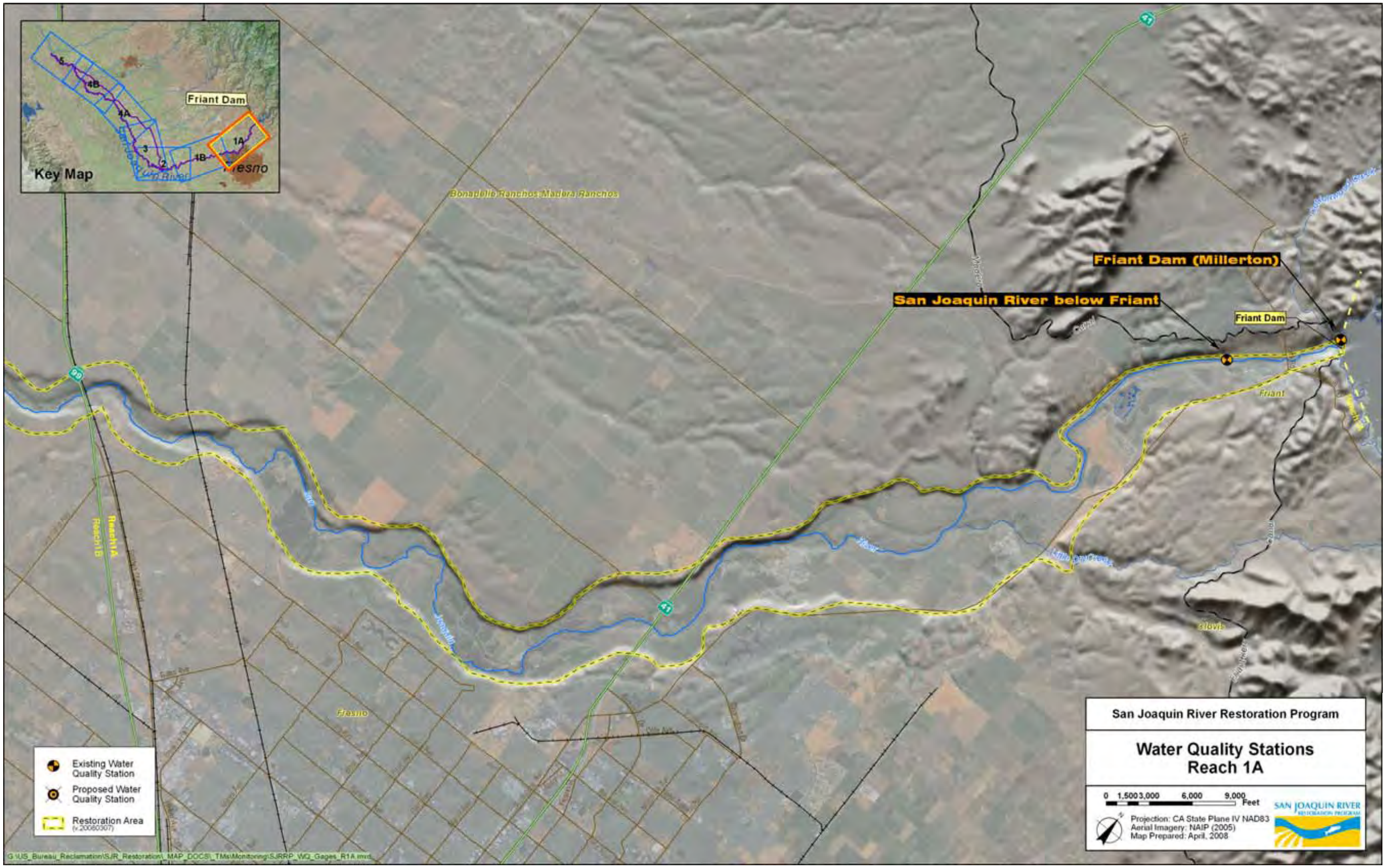

Figure 4.
Reach 1 Water Quality Monitoring Stations

4.6.2 Reach 2

Water quality monitoring locations within Reach 2 are described in Tables 8 and 9, and shown in Figure 5.

Table 8.
San Joaquin River at Gravelly Ford

Description	This site is located about 40 miles downstream from Friant Dam, where the last riparian diversion occurs; from here, the Restoration Flows will sustain the river.
Purpose	To measure the volume and temperature of water in the river.
Responsible Agency	Reclamation, Friant Dam office.
Existing Equipment	Stage recorder, multiple parameter sonde, linked to CDEC via satellite.

Table 9.
San Joaquin River below Chowchilla Bifurcation

Description	This site is located about 54 miles downstream from Friant Dam, below the Chowchilla Bypass. This is a flood control channel and inlet to the Mendota Pool.
Purpose	To measure the volume and temperature of water in the river.
Responsible Agency	Reclamation, Friant Dam office.
Existing Equipment	Stage recorder, multiple parameter sonde linked to CDEC via satellite.

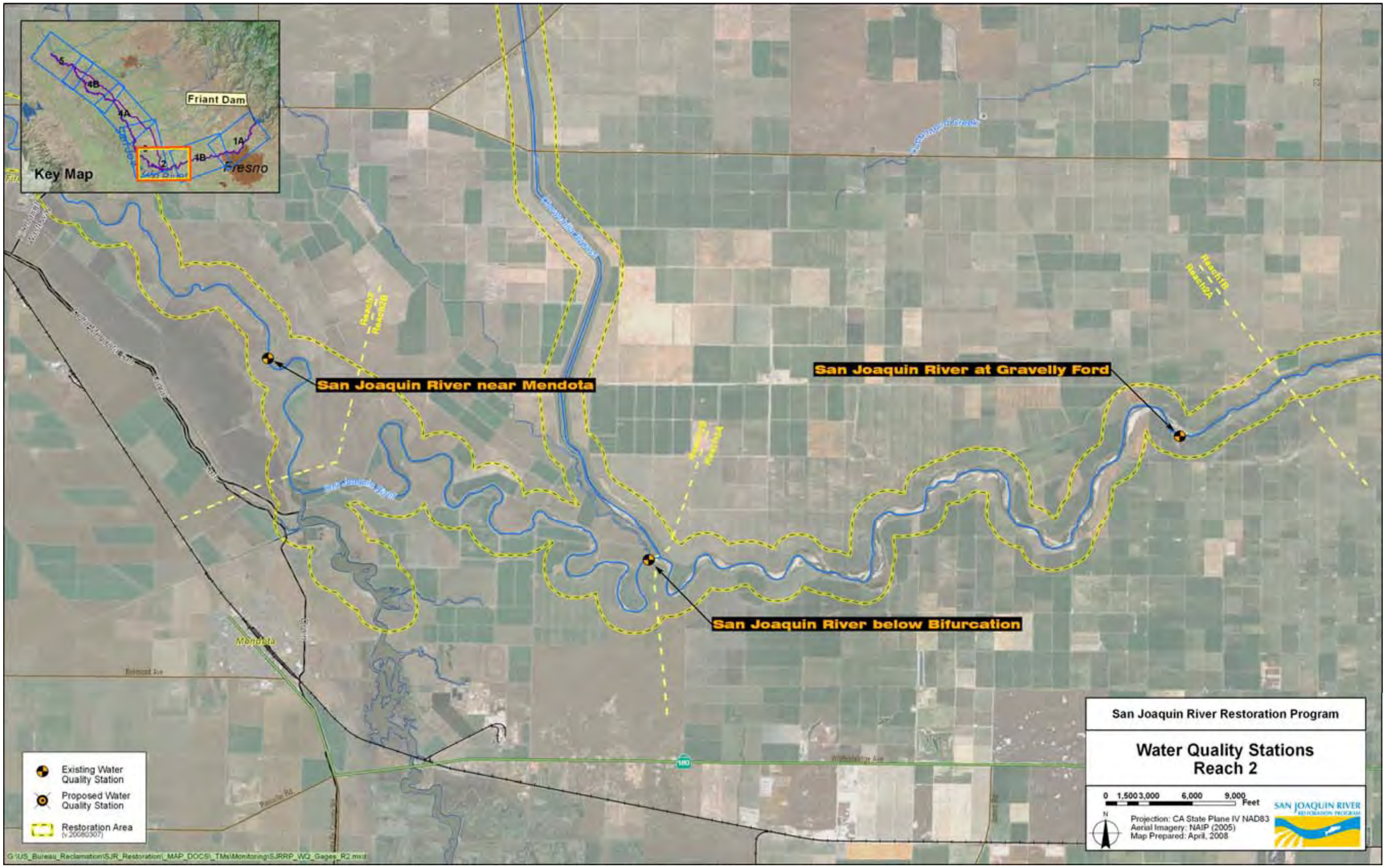

Figure 5.
Reach 2 Water Quality Monitoring Stations

4.6.3 Reach 3

Table 10 describes the location of a water quality monitoring station for the SJRRP in Reach 3, shown in Figure 6. In addition to the station described below, Reclamation will operate two water quality stations that measure the quality of water in the Mendota Pool: Delta-Mendota Canal Check 21, and Central California Irrigation District Main Canal headworks at Bass Avenue. Data from these sites will be integrated into this Monitoring Plan.

Table 10.
San Joaquin River near Mendota (below Mendota Dam)

Description	The Mendota Dam impounds water from the Kings River, San Joaquin River, and Delta-Mendota Canal. The blend of waters varies in volume and quality. Possible site for an autosampler.
Purpose	To measure the volume, temperature, and quality of water in the river.
Responsible Agency	Reclamation (MP-157)
Existing Equipment	Stage recorder, linked to CDEC.
Revision	Add multiple parameter sonde and autosampler; connect power supply.

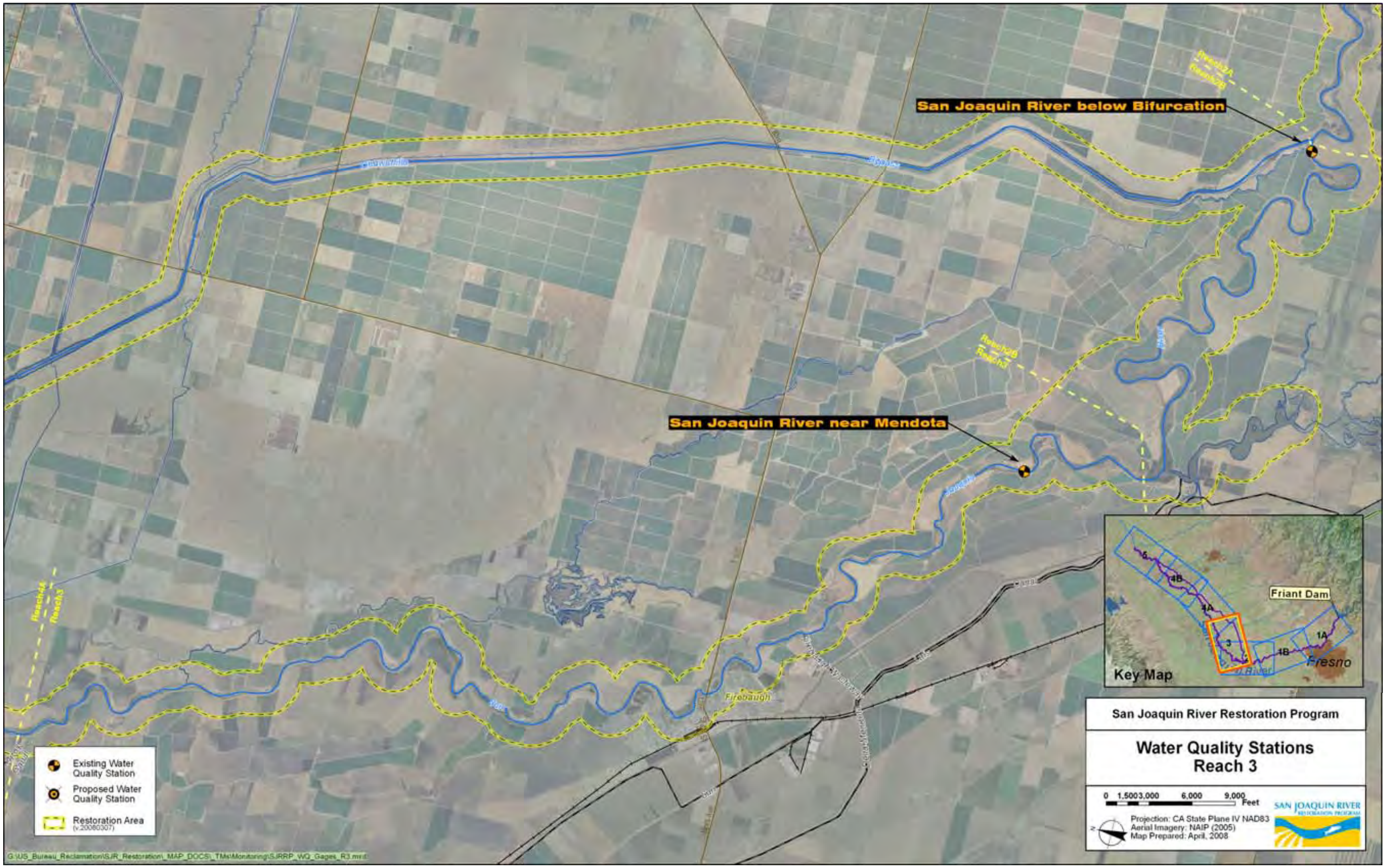

Figure 6.
Reach 3 Water Quality Monitoring Stations

4.6.4 Reach 4

The water quality monitoring stations for the SJRRP in Reach 4 are described in Tables 11 and 12, and shown in Figure 7. In addition to the sites described below, flow and water quality data collected by the USGS and Central Valley RWQCB for Salt Slough at Lander Avenue may be used by the SJRRP. The USGS measures flow, electrical conductivity (EC), and temperature at this site, and the Central Valley RWQCB collects water samples each week to analyze selenium and boron. DWR collects flow data in the River at Lander Avenue (Highway 165).

Table 11.
San Joaquin River near Dos Palos (below Sack Dam)

Description	This is a major point of diversion of water to agriculture and wildlife refuges. SJRRP flows will sustain the river below this point.
Purpose	To measure the volume, temperature, and water quality in the river.
Responsible Agency	DWR
Existing Equipment	Flow measurement and multiple parameter sonde.

Table 12.
San Joaquin River at the Top of Reach 4B

Description	The river at this site receives water from the east via the Mariposa and Eastside bypasses, and from the west via Salt Slough.
Purpose	The quality of the blended waters may be harmful to migrating fish.
Responsible Agency	TBD
Existing Equipment	None
Revision	Install flow measurement devices and multiple parameter sonde.

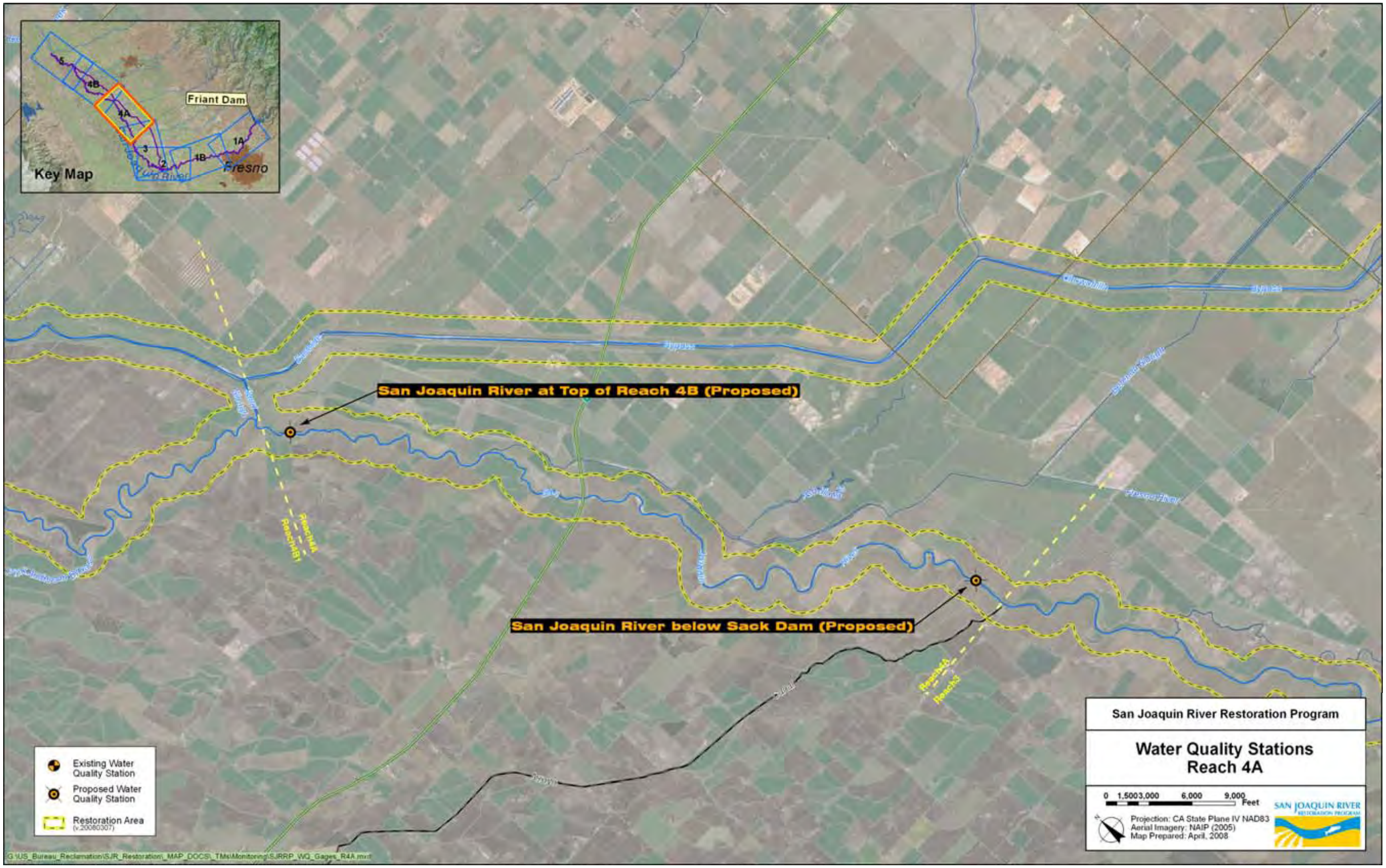

Figure 7.
Reach 4 Water Quality Monitoring Stations

4.6.5 Reach 5

Tables 13 and 14 describe locations of water quality monitoring stations for the SJRRP in Reach 5. The locations of these stations are shown in Figure 8. Water quality data collected by other agencies at tributaries to the San Joaquin River near Reach 5 may be used by the SJRRP. These sites include Mud Slough near Gustine, and Newman Wasteway. At Mud Slough near Gustine, USGS measures EC and temperature, while Central Valley RWQCB collects water samples each week to analyze selenium and boron. When water is released from the Delta-Mendota Canal to the San Joaquin River through the Newman Wasteway, Reclamation monitors water quality and toxicity in the Newman Wasteway and San Joaquin River.

Table 13.
San Joaquin River at Fremont Ford Bridge

Description	The river at this site receives water from local farms and refuges and Salt Slough (Grassland Bypass Project Station G).
Purpose	To measure flow and quality of water in Reach 5.
Responsible Agency	Flow, EC, temperature: USGS Other parameters: Central Valley RWQCB (SWAMP)
Existing Equipment	GOES station, linked to CDEC.
Revision	Upgrade existing multiple parameter sonde to measure turbidity and dissolved oxygen.

Note:
Flow and water quality separately funded by Reclamation and Central Valley RWQCB, respectively. Based on available funds, the Grassland Bypass Project will continue to monitor flow, salinity, temperature, selenium, and nutrients. These data will be incorporated in this Monitoring Plan.

Table 14.
San Joaquin River at Hills Ferry

Description	The site is located at Hills Ferry, about one half-mile upstream from the confluence of the Merced River.
Purpose	This is where the net volume of water attributed to SJJRP Flows will be measured. Many biological and water quality parameters have been measured here for with the Grassland Bypass Project.
Responsible Agency	Flow, EC, temperature: USGS
Existing Equipment	GOES station, linked to CDEC; autosampler site

Note: Weekly grab samples for selenium and boron are collected for Grassland Bypass Project.

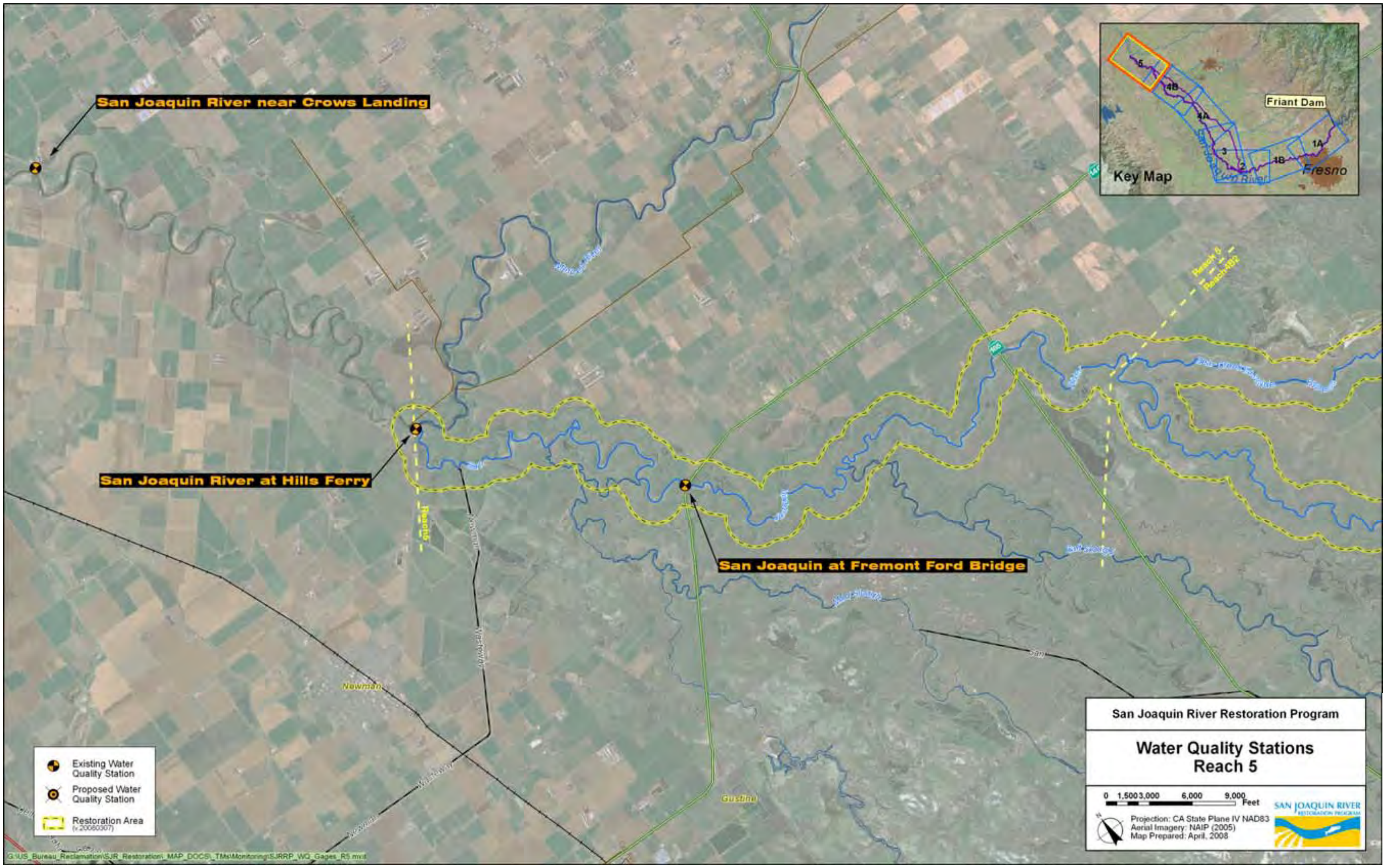

Figure 8.
Reach 5 and San Joaquin River Below Merced River Water Quality Monitoring Station

4.6.6 San Joaquin River Below Merced River

Table 14 describes a San Joaquin River water quality monitoring location located below the Merced River confluence, downstream from Reach 5. This water quality monitoring station is shown in Figure 7.

Table 14.
San Joaquin River at Crows Landing

Description	San Joaquin River below Merced River (Grassland Bypass Project Station N).
Purpose	Assess net benefit to lower San Joaquin River from SJRRP; compare with long history of flow and water quality data.
Responsible Agency	Flow, EC, temperature: USGS Water quality: Central Valley RWQCB (GBP)
Existing Equipment	GOES station, linked to CDEC, autosampler on dock.

Note: Water quality separately funded by Reclamation and Central Valley RWQCB. Based on available funds, the Grasslands Bypass Project will continue to monitor flow, salinity, temperature, selenium, nutrients, and other parameters here. These data will be incorporated in this Monitoring Plan.

4.7 Data Management

Each agency and contractor collecting data for the 2009-2013 Interim Flows Water Quality Monitoring Plan shall be responsible for its own data reduction (analysis), internal data quality control, data storage, and data reporting. Each will provide its data to the independent data management organization (DMO) for compilation, publication, and distribution of printed copies.

The DMO will specify the format for all reports, data tables, graphics, and charts. The DMO will specify how raw data will be presented by the collecting agencies, and how the final reports will be published (e.g., Adobe PDF). Reclamation will coordinate with participating agencies and the DMO to ensure compliance with suggested data dissemination procedures and formats.

All data collected under this Monitoring Plan will be compatible with the 2005 Surface Water Ambient Monitoring Program (SWAMP) Information Management Plan.

Data will be labeled according to accuracy and degree of verification:

- Real-Time – Raw data from in-situ sensors; preliminary and subject to change upon review and calibration by the collecting agency
- Provisional Data - Data that have been reviewed by the collecting agency but still may be changed pending reanalysis or statistical review
- Laboratory Data – Data produced by the laboratory following laboratory QA/QC protocols and verified by the QA Officer.

5.0 Coordination and Review Strategy

5.1 Interagency Streamflow and Water Quality Monitoring Subgroup

The SJRRP Interagency Streamflow and Water Quality Monitoring Subgroup consists of representatives from the following agencies:

- Central Valley Regional Water Quality Board
- U.S. Fish and Wildlife Service
- U.S. Environmental Protection Agency
- California Department of Water Resources
- National Marine Fisheries Service
- California Department of Fish and Game
- U.S. Bureau of Reclamation

The SJRRP Streamflow and Water Quality Monitoring Subgroup was started to coordinate data and provide for real-time management of results at the start of release of Interim Flows from Friant Dam on October 1, 2009. The Subgroup will continue to have regular conference calls to discuss updates and data related to the release of flows from Friant Dam and the related information collected from the San Joaquin River as water moves through the existing channel during Interim Flow releases. Compilations of data will be reviewed by the Subgroup to identify trends and justify changes to this Monitoring Plan to allow for real-time management. An annual meeting will occur with Interagency staff to review collected water quality monitoring data, to analyze the general trends, and to write an annual report that summarizes the findings.

5.2 Items to be Addressed During Information Collection

As this Monitoring Plan is developed and analysis is completed and disseminated to appropriate agencies, it is anticipated that elements of this Monitoring Plan may change in order to adapt to changing conditions, new policy, and suggested improvements to specific procedures.

Several existing outstanding items that are not addressed specifically in this report, but are anticipated to be developed through coordination with appropriate agencies are the following:

- Assessment questions identified in the SWAMP assessment framework that monitoring will address.
- Determination of a possible link to statewide monitoring framework components,
- Integration of project data into the 305(b)/303(d) reporting cycle

6.0 Quality Assurance

Quality control (QC) is the overall system of technical activities that measure the attributes and performance of a process, item, or service against defined standards to verify that stated requirements are met.

Quality assurance (QA) is an integrated system of management activities involving, planning, implementation, documentation, assessment, reporting, and quality improvement to ensure that a process, item, or service is of the type and quality needed and expected by the customer.

A Quality Assurance Project Plan will be written for this Monitoring Plan. The QAPP will be administered by the Quality Control Officer for Reclamation. QA objectives will be used to validate the data for this project. The data will be accepted, rejected, or qualified based on how sample results compare to established acceptance criteria[9].

The precision, accuracy, and contamination criteria will be used by the QCO to validate the data for this project. The criteria will be applied to the blind external duplicate/split, blank, reference, or spiked samples submitted with the production samples to the analytical laboratories by the participating agencies to provide an independent assessment of precision, accuracy, and contamination.

Laboratories analyze their own QC samples with the client's samples. Laboratory QC samples, including laboratory fortified blanks, matrix spikes, duplicates, and method blanks, assess precision, accuracy, and contamination. Laboratory QC criteria are stated in the analytical methods or determined by each laboratory. Since internal control ranges are often updated in laboratories based on instrumentation, personnel, or other influences, it is the responsibility of the QCO to verify that these limits are well documented and appropriately updated during system audits. The preferred method of reporting the QC results is for the laboratory to provide a QC summary report with acceptance criteria for each QC parameter of interest.

For water and sediment results, the QCO will use a statistical program to determine if current concentrations for parameters at given sites are consistent with the historical data at these sites. A result is determined to be a historical outlier if it is greater than 3 standard deviations from the average value for the site. The presence of an outlier could indicate an error in the analytical process or a significant change in the environment.

Samples must be prepared, extracted, and analyzed within the recommended holding time for the parameter. Data may be disqualified if the sample was analyzed after the holding time expires.

Completeness refers to the percentage of project data that must be successfully collected, validated, and reported to proceed with its intended use in making decisions.

[9] U.S. Bureau of Reclamation, Mid-Pacific Region. May 2001. Standard Operating Procedures for Environmental Monitoring. Sacramento.

Constraints with regard to time, money, safety, and personnel were some of the factors in choosing the most representative sites for this project. Monitoring sites have been selected by considering the physical, chemical, and biological boundaries that define the system under study.

Sites also were selected to be as representative of the system as possible. However, the ad hoc Data Collection and Review Team (DCRT) will continue to evaluate the choice of the sites with respect to their representativeness and will make appropriate recommendations to the Water Quality Monitoring Group given a belief or finding of inadequacy.

Comparability between each agency's data is enhanced through the use of Standard Operating Procedures (SOP) that detail methods of collection and analysis. Each agency has chosen the best available protocol for the sampling and analyses for which it is responsible based on the agency's own expertise. Audits performed by the QCO will reinforce the methods and practices currently in place and serve to standardize techniques used by the agencies.

7.0 Reporting

Preliminary real-time flow data will be posted on the CDEC. The purpose of this data is to provide an instant estimate of field conditions. Real-time flow data will be posted on the Web site as preliminary, subject to change. The data will be available for 5 years, after which the data will be archived by Reclamation and provided on request.

The DMO will prepare quarterly data compilation reports that will list mean daily available flow and temperature at the monitoring locations, plus all available water quality results. The report will include summary calculations, charts, and graphics to show cumulative effects. The data will be subject to revision. The purpose of these data is to provide reliable information for analyzing trends and changes in water quality in the river. The DMO will maintain a database for download by interested parties. Reclamation will coordinate with participating agencies and the DMOto ensure compliance with suggested data dissemination procedures and formats.

Final data will be completely verified by the respective collecting agencies and published in the Annual Technical Report. The Interagency Streamflow and Water Quality Monitoring Subgroup will collaborate to prepare information for the Annual Technical Report, which will synthesize all flow and water quality monitoring data for the SJRRP, and will provide a scientific review of the data to determine how the SJRRP is meeting its objectives.

Appendix A
Excerpts from Paragraph 15 of the Settlement Agreement

15. Prior to the commencement of full Restoration Flows pursuant to this Settlement, the Parties agree that the Secretary shall begin a program of interim flows, which will include releases of additional water from Friant Dam commencing no later than October 1, 2009, and continuing until full Restoration Flows begin. Flows released according to the provisions of this Paragraph 15 shall be referred to as "Interim Flows." The Restoration Administrator, in consultation with the Technical Advisory Committee, the Secretary, and other appropriate Federal, State and local agencies, shall develop and recommend to the Secretary implementation of a program of Interim Flows in order to collect relevant data concerning flows, temperatures, fish needs, seepage losses, recirculation, recapture and reuse. Such program shall include releasing the flows identified in Exhibit B for the appropriate year type to the extent that such flows would not impede or delay completion of the measures specified in Paragraph 11(a), or exceed existing downstream channel capacities. To the extent that any gauging locations identified in Paragraph 13(g) are not available to measure flows due to in-channel construction related to Paragraph 11 improvements and until such gauging locations are installed, Interim Flows will be measured by establishing any necessary temporary gauging locations or by manual flow measurements for the purposes of collection of relevant data. The Parties anticipate that a program of Interim Flows would include:

(a) In 2009, release flows from October 1 through November 20 of a timing and magnitude as defined in the appropriate year type hydrograph [flow schedule] specified in Exhibit B, and without exceeding the then existing channel capacities;

(b) In 2010, release flows from February 1 through December 1 of a timing and magnitude as defined by Exhibit B for the appropriate year type, and without exceeding the then existing channel capacities;

(c) In 2011 and 2012, assuming in-channel construction begins May 1, release flows from February 1 through May 1 of a timing and magnitude as defined by Exhibit B for the appropriate year type, and without exceeding the then existing channel capacities. From May 1 through September 1, release flows to wet the channel down to the Chowchilla Bifurcation Structure to collect information regarding infiltration losses; and

(d) In subsequent years, if the highest priority channel improvements identified in Paragraph 11(a) are not completed, release flows for the entire year of a timing and magnitude as defined by Exhibit B for the appropriate year type, without exceeding the then existing channel capacities or interfering with any remaining in-channel construction work on the highest priority Paragraph 11 improvements.

(e) For purposes of implementing the Interim Flows specified in 15(a) through 15(d), the Secretary, in consultation with the Restoration Administrator, shall determine the then existing channel capacity and impact of Interim Flows on channel construction work."

Appendix B
Excerpts from Condition 22 of the Water Rights Order

22. Reclamation shall collect baseline information to evaluate potential impacts to Mendota National Wildlife Refuge and other resources associated with the temporary transfer. For this effort, Reclamation shall collect sediment and water quality information at the locations and for the parameters specified in Table 1. Samples shall be collected at least one week before interim flows reach the respective monitoring station to capture baseline data. If sediment sample concentrations are below criteria identified by the Deputy Director for Water Rights, then no additional sediment, organo-chlorine or pyrethroid sampling shall be required during the fall 2009 interim flow. If samples exceed the proposed criteria, Reclamation shall continue all sampling specified in Table 2 developed by the Central Valley Regional Water Quality Control Board (Central Valley Water Board) and Reclamation. Approximately one week after interim flows reach the respective monitoring station, water samples shall be collected at each location and analyzed for organic and inorganic water quality parameters as specified in Table 2. Reclamation shall compile real-time data from sites listed in Table 3 to monitor flow and physical parameters during the study period.

By January 1, 2010, Reclamation shall develop a monitoring plan, acceptable to the Deputy Director for Water Rights, for the releases beginning after February 1, 2010. Prior to submitting the plan to the Division of Water Rights, Reclamation shall obtain the written comments of the Central Valley Water Board, U.S. Fish and Wildlife Service, and California Department of Fish and Game. The plan is subject to review, modification and approval by the Deputy Director for Water Rights.

Until approval of a final monitoring plan, samples collected as part of this project must include field duplicates at a rate of 5% of the total project sample count at sites that includes all parameters to be analyzed. Additional quality assurance samples may be required by specific analytical methods.

Results from all water quality monitoring must be submitted to the Central Valley Water Board and Division of Water Rights within two months of data collection. Results shall include: laboratory name where results were analyzed, analytical result, analytical method, field duplicate results, and laboratory quality control, including laboratory blanks, reference material, matrix spikes, and laboratory duplicates.

At a minimum, analyses for each parameter group will include the following:

- *TSS =Total suspended solids*

- *Nutrients: TN, NH4, N02, N03, TKN, TP, P04, chlorophyll*

- *TOC/DOC: total and dissolved organic carbon*

- *Bacteria: Fecal coliform and E. coli*

- *Trace Elements/minerals: cations (Ca. Mg, K, Na); anions (CI, C04, HC03); total TE (copper, chromium, lead, nickel, zinc, arsenic, mercury)*

- *Pesticides: water column pre-release scans (carbamates and organophosphates); post-release scans (carbamates, organophosphates, and dependent on sediment results addition of organochlorines and pyrethroids)*

- *Bed Sediment: TOC, Trace elements (copper, chromium, lead, nickel, zinc, arsenic, mercury), organochlorine scan, pyrethroid scan, toxicity*

Appendix C
Excerpts from Page 6 and 7 of the Draft Fishery Management Plan, June 2009

Monitoring Objectives

Provide water-quality conditions suitable for Chinook salmon and other native fishes completing their life cycle without lethal or sublethal effects.

Monitoring Requirements

Constituents such as pesticides and other urban and agricultural wastes may affect water quality parameters such as DO and turbidity, creating habitat unsuitable for Chinook salmon. Sources of adverse water-quality conditions and whether or not discharge conditions will improve water quality are unknown. Evaluating and taking management actions for these conditions may be necessary to successfully meet the Restoration Goal.

Three species toxicity testing (Central Valley Water Board/EPA standards) has not been done, so it is unknown what water quality could be considered a limiting factor in Reaches 1 and 2. Water quality in Reaches 3 through 5 is considered of moderate importance because it experiences a significant amount of agricultural return flows, but effects on Chinook salmon are largely unknown.

Objectives, MCLs

To meet the SJRRP Restoration Goal, water quality should meet minimum standards for protection of aquatic resources. Because of the lack of information on the effects of many water quality constituents on Chinook salmon and other fishes, the water quality objectives for beneficial uses defined by the Central Valley Regional Water Quality Control Board (Central Valley Water Board) are used to establish water-quality goals.

The temperature objectives are based on a DFG proposal to assess temperature impairment (DFG 2007b), U.S. Environmental Protection Agency (EPA) guidelines (EPA 2003) and a report on temperature impacts on fall-run Chinook salmon and steelhead (Rich and Associates 2007).

Water-quality objectives are “the limits or levels of water quality constituents or characteristics established for the reasonable protection of beneficial uses of the water or the prevention of a nuisance in a specific area” (California Water Code Section 13050(h)).Water-quality standards consist of the designated beneficial uses and water quality objectives set forth by the State Water Resources Control Board (SWRCB) and the Central Valley Water Board and are contained in the Water Quality Control Plan for the Sacramento River Basin and the San Joaquin River Basin (Basin Plan). For the San Joaquin River system, including the Restoration Area, SWRCB has set a goal to be free from toxic substances in surface water (Central Valley Water Board 1998). Selenium, DO, and ammonia objectives are based on the Central Valley Water Board and SWRCB standards described above. Additional water-quality criteria are defined in Exhibit B.

Water temperatures for spring-run Chinook salmon adult migrants should be less than 68 °F in Reaches 3, 4, and 5 during March and April, and less than 64°F in Reaches 1 and 2 during May and June (Exhibit A, Table A-1).

Water temperatures for spring-run Chinook salmon adult holding should be less than 59°F in holding areas between April and September (Exhibit A, Table A-1).

Water temperatures for spring-run Chinook salmon spawners should be less than 57°F in spawning areas during August, September, and October (Exhibit A, Table A-1).

Water temperatures for spring-run Chinook salmon incubation and emergence should be less than 55°F in spawning areas between August and December (Exhibit A, Table A-1).

Water temperatures for spring-run Chinook salmon juveniles should be less than 64°F in the Restoration Area when juveniles are present (Exhibit A, Table A-1).

Selenium levels should not exceed 0.020 milligrams per liter (mg/L) or a 4-day average of 0.005 mg/L in the Restoration Area (Exhibit B, Table B-3).

DO concentrations should not be less than 6.0 mg/L when Chinook salmon are present (Exhibit B, Table B-3).

Total ammonia nitrogen should not exceed 30-day average of 2.43 milligrams nitrogen per liter (mg N/L) when juvenile Chinook salmon are present or exceed a 1-hour average of 5.62 mg N/L when Chinook salmon are present (Exhibit B, Table B-9). (FMP Page 3*-13)

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- Habitat Objective 5 – To provide appropriate flow timing, frequency, duration and magnitude, enabling the viability of 90 percent of all life-history components of spring-run Chinook salmon.

  – Recommended monitoring and evaluation – An analysis of streamflow and fish distribution and survival is recommended. Flow and stage measurement will occur real-time, according to procedures based on the USGS publication *Stream-Gaging Program of the U.S. Geological Survey – U.S. Geological Survey Circular 1123* (Wahl, Thomas, and Hirsch 1995). Population Monitoring Objectives 1, 2, and 6 described above will provide spring-run Chinook salmon viability.

- Habitat Objective 6 – Water temperatures for spring-run Chinook salmon adult migrants should be less than 68°F in Reaches 3, 4, and 5 during March and April and less than 64°F in Reaches 1 and 2 during May and June (Exhibit A, Table A-1).
~~~~~~~~~~~~

- Recommended monitoring and evaluation – Water temperature will be monitored real-time at two locations in Reach 1, two locations in Reach 2, one location in Reach 3, two locations in Reach 4, and two locations in Reach 5.

- Habitat Objective 7 – Water temperatures for spring-run Chinook salmon holding adults should be less than 59°F in holding areas between April and September (Exhibit A, Table A-1).

  - Recommended monitoring and evaluation – Water temperature will be monitored real-time at two locations in Reach 1, two locations in Reach 2, one location in Reach 3, two locations in Reach 4, and two locations in Reach 5.

- Habitat Objective 8 – Water temperatures for spring-run Chinook salmon spawners should be less than 57°F in spawning areas during August, September, and October (Exhibit A, Table A-1).

  - Recommended monitoring and evaluation – Water temperature will be monitored real-time at two locations in Reach 1, two locations in Reach 2, one location in Reach 3, two locations in Reach 4, and two locations in Reach 5.

- Habitat Objective 9 – Water temperatures for spring-run Chinook salmon incubation and emergence should be less than 55°F in spawning areas between August and September (Exhibit A, Table A-1).

  - Recommended monitoring and evaluation – Water temperature will be monitored real-time at two locations in Reach 1, two locations in Reach 2, one location in Reach 3, two locations in Reach 4, and two locations in Reach 5.

- Habitat Objective 10 – Water temperatures for spring-run Chinook salmon juveniles should be less than 64°F in the Restoration Area when juveniles are present (Exhibit A, Table A-1).

  - Recommended monitoring and evaluation – Water temperature will be monitored real-time at two locations in Reach 1, two locations in Reach 2, one location in Reach 3, two locations in Reach 4, and two locations in Reach 5.

- Habitat Objective 11 – Selenium levels should not exceed 0.020 mg/L or a 4-day average of 0.005 mg/L in the Restoration Area (Exhibit B, Table B-3).

  - Recommended monitoring and evaluation – Selenium levels will periodically be monitored in 5 locations as part of a short list of water quality parameters using laboratory analysis.

- Habitat Objective 12 – DO concentration should not be less than 5.0 mg/L when Chinook salmon are present (Exhibit B, Table B-3).

  - Recommended monitoring and evaluation – DO will be monitored real-time at the same locations as water temperature: two locations in Reach 1, two locations in Reach 2, one location in Reach 3, two locations in Reach 4, and two locations in Reach 5. Additional sampling sites for DO may be added, as needed.

- Habitat Objective 13 – Total ammonia nitrogen should not exceed 30-day average of 2.43 mg N/L when juvenile Chinook salmon are present or exceed a 1-hour average of 5.62 mg N/L when Chinook salmon are present (Exhibit B, Table B-9).
  - Recommended monitoring and evaluation – Total ammonia nitrogen will be monitored weekly to every other week in two locations in cooperation with the Grassland Bypass Project. Additional sampling sites for ammonia nitrogen may be added, as needed.

Banonis, Michelle

From: Jeff_McLain@fws.gov
Sent: Friday, December 18, 2009 4:28 PM
To: Banonis, Michelle
Cc: Gasdick, Alicia E; Eacock, Michael C. S.
Subject: RE: SJRRP wq monitoring plan interim flows 2010-2013.doc

Hi Michelle. I just looked over the report and have a few comments. I agree with the frequency and spatial aspects as well as the specific information proposed to be collected. My thoughts are more related to the purposes of the document. Below are my comments with specific suggestions:

1. It might be nice to add an introductory paragraph talking about how this report came about. It is basically a requirement from the SWRCB permit right?
2. I think the primary purpose is to ensure that the fish and wildlife beneficial uses fit with SWRCB requirements. Maybe TJ can provide some insight.
3. Section 3.1: again I don't think the goals are correctly stated here. I would indicate goals related to SWRCB requirements (comment #2 above). An additional paragraph could be added describing the benefits of this work as it relates to our river restoration efforts. For example, this water quality information will be used to evaluate whether or not water quality objectives as stated in the fisheries management plan are achieved and to identify other potentially important water quality constituents.
4. Hypothesis in 3.1 is too general. If you must use hypothesis, I suggest going with specific hypotheses. For example "Selenium levels in the restoration area will be less than xx mg/l between Jan and June in the Restoration Area" Fish Management Plan objectives are located on page 3-13 of the June draft.

Hope these comments are helpful.

Jeff

Jeff McLain, Fishery Biologist
San Joaquin River Restoration Program
Pacific Southwest Region
U.S. Fish and Wildlife Service
2800 Cottage Way, Suite W2606, Sacramento, CA 95825
Email: Jeff_McLain@fws.gov
Phone: (916) 978-5459

"Banonis, Michelle" <MBanonis@usbr.gov>

12/16/2009 11:26 AM

To "Eacock, Michael C. S." <MEacock@usbr.gov>, 'TJ Kopshy' <tkopshy@waterboards.ca.gov>, "Taylor, Ernest" <etaylor@water.ca.gov>, "Rice, Erin C" <erice@usbr.gov>, "mgordus@dfg.ca.gov" <mgordus@dfg.ca.gov>, John Battistoni <JBATTISTONI@dfg.ca.gov>, "Dulik, Karen" <kdulik@water.ca.gov>, Jeff McLain <jeff_mclain@fws.gov>, "Hatler, Gerald" <GHATLER@dfg.ca.gov>

cc "Gasdick, Alicia E" <agasdick@usbr.gov>

Subject RE: SJRRP wq monitoring plan interim flows 2010-2013.doc

Hi Folks,

Just a reminder that comments on the Water Quality Monitoring Plan are due today by COB. Let me know if you need an additional electronic copy sent your way.

Thanks,

Michelle Banonis
Natural Resources Specialist
San Joaquin River Restoration Program
U.S. Bureau of Reclamation
Phone: (916)978-5457
E-mail: Mbanonis@usbr.gov

From: Eacock, Michael C. S.
Sent: Friday, December 11, 2009 4:58 PM
To: Banonis, Michelle; 'TJ Kopshy'; Taylor, Ernest; Rice, Erin C; mgordus@dfg.ca.gov; John Battistoni; Dulik, Karen; Jeff McLain; Hatler, Gerald
Cc: Gasdick, Alicia E
Subject: RE: SJRRP wq monitoring plan interim flows 2010-2013.doc

fyi

We collected post-release samples of sediment from four places along the San Joaquin River according to the Water Rights Order. We also took two samples of sediment from the Mendota Pool and one from within the Mendota Wildlife refuge. All will be tested for Metals, pyrethroids, OC pesticides, TOC in soil, and Acute toxicity.

From: Banonis, Michelle
Sent: Tuesday, December 08, 2009 9:29 AM
To: 'TJ Kopshy'; Taylor, Ernest; Rice, Erin C; mgordus@dfg.ca.gov; John Battistoni; Dulik, Karen; Jeff McLain; Hatler, Gerald
Cc: Eacock, Michael C. S.; Gasdick, Alicia E
Subject: FW: SJRRP wq monitoring plan interim flows 2010-2013.doc

Hi team,

Here is the draft water quality monitoring plan. Could you please take a look and make comments and send to Chris by C.O.B. December 16, 2009?

Thank you,

Michelle Banonis
Natural Resources Specialist
San Joaquin River Restoration Program
U.S. Bureau of Reclamation
Phone: (916)978-5457
E-mail: Mbanonis@usbr.gov

From: Eacock, Michael C. S.
Sent: Monday, December 07, 2009 5:18 PM
To: Banonis, Michelle
Subject: SJRRP wq monitoring plan interim flows 2010-2013.doc

<< File: sjrrp wq monitoring plan interim flows 2010-2013.doc >>

Hi Michelle

Here is the first rough draft of the monitoring plan for the SJRRP Interim Flows. I will be in training Tuesday and Wednesday. The main thing we need to decide on is routine monitoring - where, what, how often. This will depend on the results of the Fall 2009 flows.

Chris

Banonis, Michelle

From: Gerald Hatler [ghatler@dfg.ca.gov]
Sent: Wednesday, December 30, 2009 1:34 PM
To: Jeff McLain; Banonis, Michelle; Eacock, Michael C. S.
Cc: Mary Jane Taylor; Gasdick, Alicia E; 'tkopshy@waterboards.ca.gov'
Subject: Re: Water Quality Monitoring Plan Comments

Michelle,

My comments are highly informal and intended to be constructive as stated below. I'm concerned that the Monitoring Plan as written may not meet the Board's objectives for the following reasons:

- The Monitoring Plan should clearly reflect all monitoring parameters specified by the Water Quality Control Board (Board) and avoid additional details that may not be of interest to them. This may have been addressed but I don't think DFG has viewed all orders the Program may have received from the Board and, therefore, our comments reflect our limited understanding of the draft monitoring plan request. Frequently, regulatory agencies are challenged by muddied details that lack clear objectives and/or fail to establish a straightforward response to issues raised by the regulatory agency. If this is so, working with the Board and getting their approval will be much more difficult. For example, I'm not sure chlorophyll is of interest to the Board and stating that a "list of constituents to be measured...will be determined according to the needs of the scientists handling the fish restoration" is likely to be irrelevant. Again, you need to be sure the Plan ties back to what they're specifically requesting.

- Somewhat related and potentially contradictory to the aforementioned statement, DFG is most concerned that Program monitoring related to beneficial use address DFG's objectives for listing the upper San Joaquin River as temperature impaired under the EPA's 303d listing rules. Recognizing that DFG is conducting most of the monitoring related to this issue for the Program and that the Board may not have regulatory authority for this issue until the ruling change is approved, it may be beneficial for the Program to proactively address temperature impairment in development of a monitoring plan. I would, however, let staff from the Board advise on this issue.

- It's not clear that the objectives are tied to the Sacramento/San Joaquin River Basin Water Quality Control Plan. This would clearly link our Monitoring Plan to the Board's objectives.

- The methods and analyses should clearly articulate how the Monitoring Plan is compliant with the Surface Water Ambient Monitoring (SWAMP) Quality Assurance Monitoring Program guidelines. It appears as though the Monitoring Plan describes methods and analyses that support Program objectives and not necessarily the objectives of the Board.

- Again, the monitoring stations described in the Plan support Program objectives but I doubt the Board will consider the number of stations sufficient to support their objectives (I don't think the Settlement intended for the monitoring stations to serve water quality monitoring standards).

- It is likely that the Board will expect a full series of parameters to be measured at each station (including physical, temp., DO, EC, etc.). The Plan currently describes a mixed series. Again, it needs to be consistent with the Board's objectives. The nutrient series should also include nitrite and ammonium (these should be described in the Basin Plan and SWAMP).

Please let me know if you have any questions or need anything else.

Gerald Hatler
Senior Environmental Scientist
Fisheries Supervisor
San Joaquin River Restoration
California Department of Fish and Game
1234 E. Shaw Avenue
Fresno, CA 93710

(559) 243-4014, ext. 259
(559) 341-1814 Mobile
(559) 243-3004 Fax

2009 – 2013 Interim Flow Release Program
Water Quality Monitoring Plan

SAN JOAQUIN RIVER
RESTORATION PROGRAM

December 4, 2009

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Appendix

List of Abbreviations and Acronyms

ºC	degrees Celsius
ºF	degrees Fahrenheit
COC	chain of custody
CVP	Central Valley Project
Central Valley RWQCB	Central Valley Regional Water Quality Board
DCR	Data Collection and Review Subgroup
Delta	Sacramento-San Joaquin Delta
DFG	California Department of Fish and Game
DMO	data management organization
DO	dissolved oxygen
DWR	California Department of Water Resources
EC	electrical conductivity or specific conductance
which is it? SC or EC—they're not the same	
FWUA	Friant Water Users Authority
mg/L	milligrams per liter
mmol/L	millimoles per liter
NRDC	Natural Resources Defense Council
O_2	oxygen
PEIS/R	Program Environmental Impact Statement/Report
ppm	parts per million
QA	Quality Assurance
QC	Quality Control
QCO	Quality Control Officer
Reclamation	U.S. Department of the Interior, Bureau of Reclamation
SJRRP	San Joaquin River Restoration Program
SOP	standard operating procedure
SWAMP	Surface Water Ambient Monitoring Program
TM	Technical Memorandum
USGS	U.S. Geological Survey
USFWS	U.S. Fish and Wildlife Service

SUMMARY SHEET

The purpose of this document is to describe a program to monitor water quality changes that will occur with the 2010 – 2013 Interim Flow Release Program of the San Joaquin River Restoration Program (SJRRP). This document was prepared by the Interagency Water Quality Monitoring Workgroup[1]. The monitoring plan, as proposed, will be conducted by staff of these agencies and will complement independent monitoring by other Federal, State, and private agencies.

Publicly available, high quality data are critical for demonstrating compliance with the provisions of the 2006 Settlement Agreement[3] and determining the impacts of Interim Flows on water quality conditions in the river between Friant Dam and the confluence with the Merced River. Several sampling techniques will be used to collect samples of water, including real-time, grab, and composite. Autosamplers will be used to collect composite samples at four locations.

Deleted: This is a monitoring plan for measuring the quality of water that will be released from Friant Dam to the San Joaquin River, as required by the 2006 Settlement Agreement[2]

Deleted: Several sampling techniques will be used to collect samples of water, including real-time, grab, and composite. Autosamplers will be used to collect composite samples at four locations.

The core of the program will be a series of in-situ sondes along the river. Continuous measurement of physical conditions, including temperature, specific conductance (salinity), pH, dissolved oxygen (DO), turbidity, and chlorophyll, will be recorded using multiple parameter sondes connected to digital data loggers. The data will be averaged every 15 minutes and the sent via satellite to the Internet as preliminary data. The real-time data will be displayed in an interactive graphic with links to data.

Additional data may be collected based on initial findings from the 2009 Interim Release and needs of scientist handling fish restoration.

Verified data will be compiled and published on-line by an independent data management organization. Annual synthesis reports will be written by staff of the agencies and contractors collecting the data for this plan.

Data from this program will be used to verify the support of the beneficial uses outlined in the Water Quality Control Plan for the Sacramento and San Joaquin River Basins (CRWQCB-CVR 2007) (Basin Plan). These include Municipal, Industrial, Recreational, and Aquatic Life Uses.

Deleted: 1. Beneficial uses

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[1] U.S. Department of the Interior, Bureau of Reclamation (Reclamation), Fish and Wildlife Service (FWS), the California Departments of Water Resources (DWR) and Fish and Game (DFG), and the California Environmental Protection Agency.

[3] Natural Resources Defense Council, et al. v. Kirk Rodgers, as Director of the Mid-Pacific Region of the U. S. Bureau of Reclamation, et al. September 13, 2006. Stipulation of Settlement. U. S. District Court, Eastern District of California (Sacramento Division).

You need to list the questions that YOUR monitoring program will be answering—e.g. Is water quality moving through the study reach of sufficient quality to support restoration of salmonid? And/or Is there any indication that the restoration releases are having a negative impact on beneficial uses within the study area?

Deleted: 2. Associated assessment questions identified in the SWAMP assessment framework that the monitoring will address.

Comment [RS1]: These guidelines are required for SWAMP funded projects and do not apply to the SJRRP

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¶
3. Any visible link to the statewide monitoring framework components. ¶
¶
4. The integrated 305(b)/303(d) report cycle for which project data will be available. ¶

1.0 Title

San Joaquin River Restoration Program

2010 – 2013 Interim Flow Release Water Quality Monitoring Program

2.0 Background

Friant Dam is operated by the United States Bureau of Reclamation (Reclamation). It is located on the San Joaquin River which is the second largest river in the state of California. Water has been diverted from the river below the dam since 1952 to irrigate more than a million acres of farmland that produce a variety of crops worth over $2.5 billion annually. Numerous communities depend on Friant water, such as the City of Fresno, and it is the sole source of water for the small communities of Friant, Orange Cove, Lindsay, Strathmore and Terra Bella. These diversions have removed most of the water from the river, and many times the river has been dry at Gravelly Ford, about 40 miles below the dam.

In 1988, a coalition of environmental groups, led by the Natural Resources Defense Council (NRDC), filed a lawsuit challenging the renewal of long-term water service contracts between the United States and the Central Valley Project (CVP) Friant Division contractors. After more than 18 years of litigation of this lawsuit, known as NRDC et al. v. Kirk Rodgers et al., a settlement (Settlement) was reached. On September 13, 2006, the Settling Parties, including NRDC, Friant Water Users Authority (FWUA), and the U.S. Departments of the Interior and Commerce, agreed on the terms and conditions of the Settlement, which was subsequently approved by the U.S. Eastern District Court of California on October 23, 2006.

The San Joaquin River Restoration Program (SJRRP) will implement the Settlement. It is a comprehensive long-term effort to restore flows in the San Joaquin River from Friant Dam to the confluence of the Merced River, ensure irrigation supplies to Friant water users, and restore a self-sustaining fishery in the river.

The Settlement has two primary goals:

- Restoration Goal – To restore and maintain fish populations in “good condition” in the mainstem San Joaquin River below Friant Dam to the confluence of the Merced River, including naturally reproducing and self-sustaining populations of salmon and other fish.

- Water Management Goal – To reduce or avoid adverse water supply impacts on all of the Friant Division long-term contractors that may result from the Interim Flows and Restoration Flows provided for in the Settlement.

Reclamation and DWR have initiated environmental compliance documentation for the SJRRP. The Implementing Agencies have organized a Program Management Team and several Technical Work Groups to develop a plan for implementing the Settlement through a joint National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA) process, which includes preparation of a PEIS/R. Reclamation is the lead NEPA agency and DWR is the lead CEQA agency for the SJRRP.

Study Area

The Study Area for this monitoring plan (Figure ___) encompasses over 160 miles along the San Joaquin River from Millerton Lake to Crows Landing.

The San Joaquin River from Friant Dam to the Merced River confluence is the focus of this monitoring plan. This monitoring plan will also incorporate data from other agencies monitoring the San Joaquin River from Friant Dam to Vernalis (boundary of the Sacramento-San Joaquin Delta) to evaluate regional effects of the restoration effort.

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The river is divided in the five reaches between Friant Dam and the confluence with the Merced River (Figures ____ to ___) with different hydrologic features:

Reach 1	RM 268 – 225	Friant Dam to Gravelly Ford
Reach 2	RM 225 – 205	Gravelly Ford to Mendota Dam
Reach 3	RM 205 – 182	Mendota Dam to Sack Dam
Reach 4	RM 182 – 136	Sack Dam to Bear Creek
Reach 5	RM 136 – 118	Bear Creek to Hills Ferry
	RM 107	Crows Landing

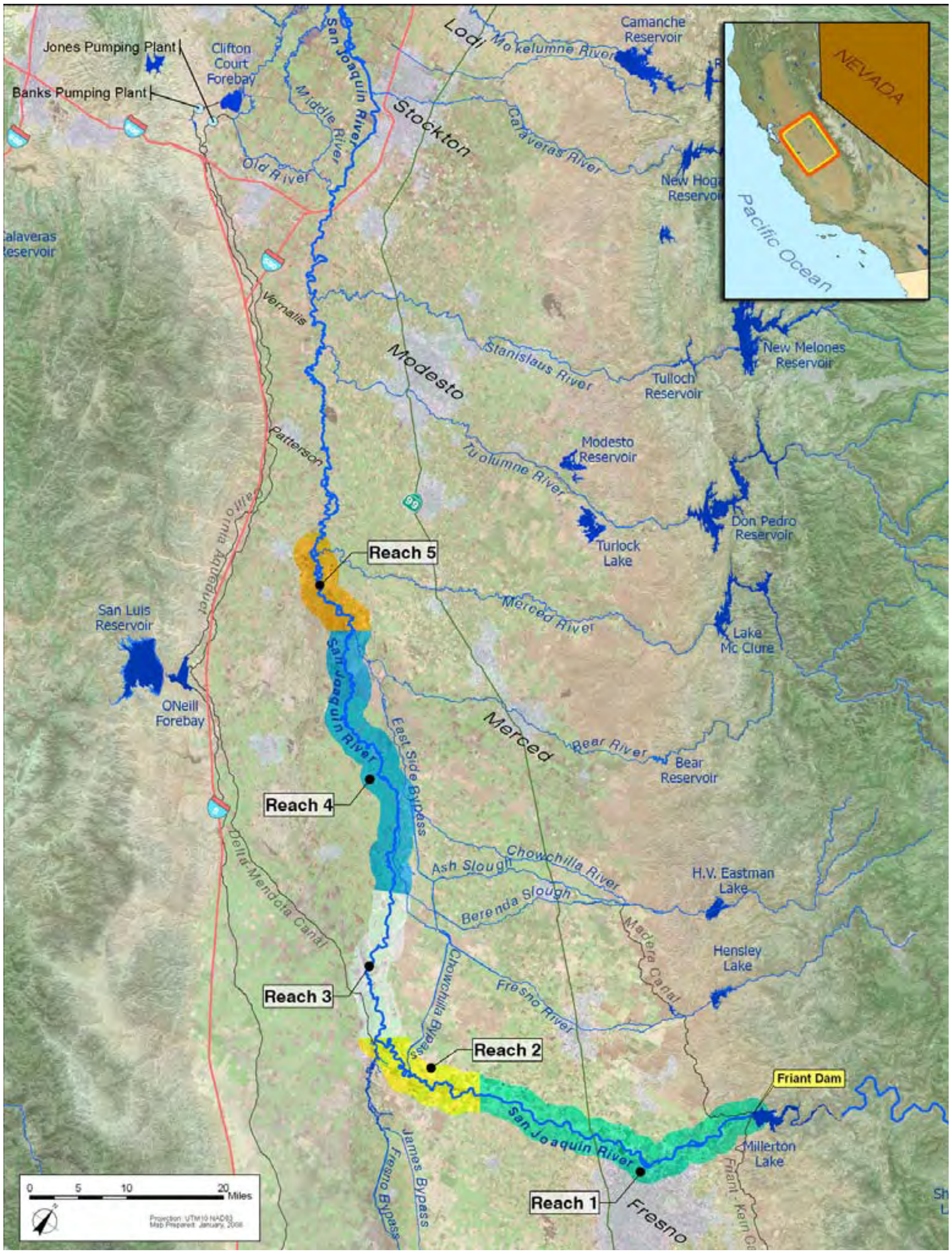

Figure 1. Location Map – San Joaquin River Restoration Program showing five reaches of the study area between Friant Dam and the confluence with the Merced River.

Figure 2 is a diagram showing the locations of the stations with respect to major tributaries to and diversions from the San Joaquin River. The locations of water quality monitoring stations for the SJRRP water quality monitoring plan are summarized in Table __. Water quality monitoring stations, including responsible agency, existing equipment, and cost of equipment upgrades, are described in the following sections, by designated river reach.

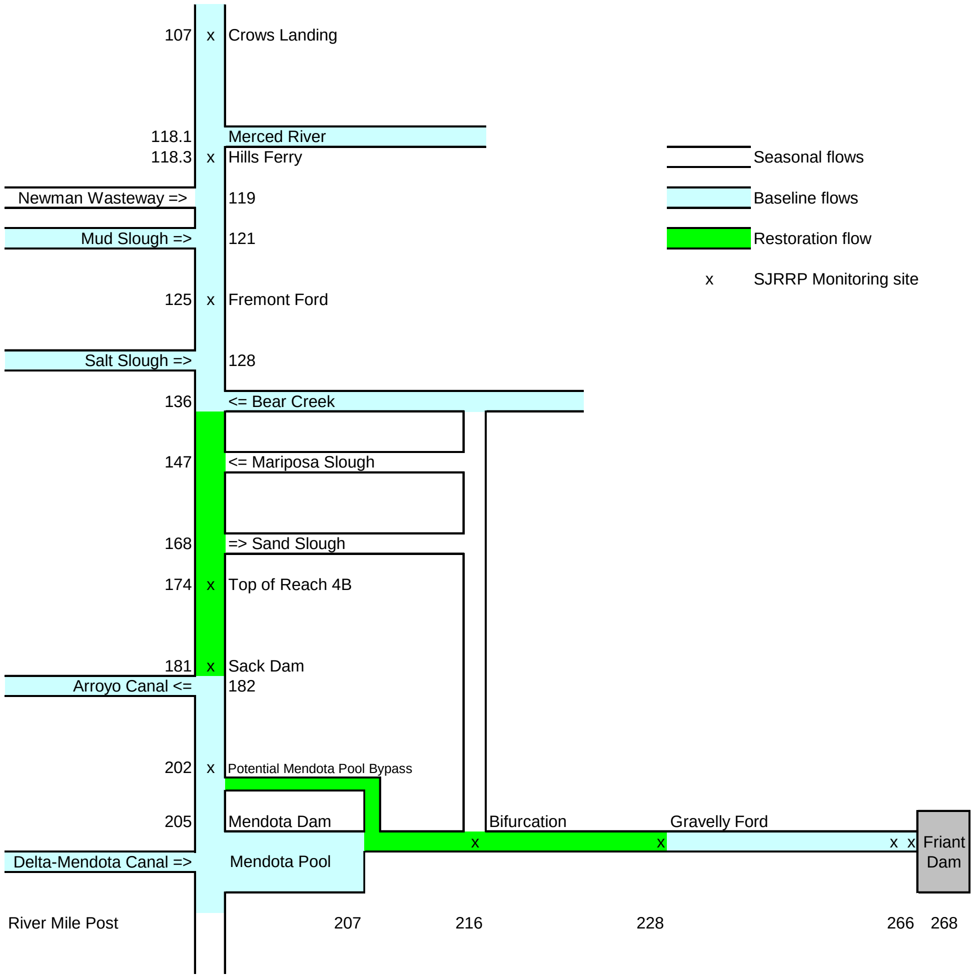

Figure 2. Schematic Diagram of San Joaquin River from Friant Dam to Below Merced River

Table 1. Water Quality Monitoring Stations

Location	Responsible Agency	Parameters	Frequency	Remarks
San Joaquin River at Friant Dam	Reclamation (SCCAO)	Physical [1]	Continuous	Multiple parameter sonde
San Joaquin River below Friant Dam (Lost Lake Park)	Reclamation (SCCAO)	Physical [1]	Continuous	Multiple parameter sonde
	Reclamation (MP157)	Short list* [2] Baseline [3]	Daily composite* Quarterly	Autosampler* Grab sample
San Joaquin River at Gravelly Ford	Reclamation (SCCAO)	Temperature	Continuous	Multiple parameter sonde
San Joaquin River below bifurcation	Reclamation (SCCAO)	Temperature	Continuous	Multiple parameter sonde
Delta-Mendota Canal Check 21	Reclamation (MP-157)	EC, selenium	Daily composite	Autosampler
CCID Main Canal at bass Avenue	Reclamation (MP-157)	EC, selenium	Daily composite	Autosampler
San Joaquin River near Mendota (below Mendota Dam)	Reclamation (SCCAO)	Physical [1]	Continuous	Multiple parameter sonde
	Reclamation (MP157)	Short list* [2] Baseline* [3]	Daily composite* Quarterly*	Autosampler* Grab sample*
San Joaquin River below Sack Dam	DWR	Physical* [1]	Continuous*	Multiple parameter sonde*
San Joaquin River at top of Reach 4B	TBD	Physical* [1]	Continuous*	Multiple parameter sonde*
San Joaquin River at Fremont Ford Bridge	USGS	Physical [1]	Continuous	Multiple parameter sonde
	Central Valley RWQCB	Selenium, boron, nutrients[4], others [5]	Weekly	Grassland Bypass Project Station H
San Joaquin River at Hills Ferry	USGS	Physical* [1]	Continuous*	Multiple parameter sonde
	SLDMWA	Selenium, boron	Weekly	Grassland Bypass Project Station H
	Reclamation (MP157)	Short list* [2] Baseline* [3]	Daily composite* Quarterly	Autosampler* Grab sample*
San Joaquin River near Crows Landing	USGS	Physical [1]	Continuous	Grassland Bypass Project Station N
	Central Valley RWQCB	Selenium, boron, nutrients[4], others [5]	Daily composite Weekly	Autosampler Grab sample

Comment [RS2]: Autosampler is already in place.

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Notes:

* New equipment or sampling for the San Joaquin River Restoration Program water quality monitoring plan.

[1] Real-time measurements of specific conductance, temperature, pH, dissolved oxygen, turbidity, and chlorophyll

[2] Short list of constituents for lab analysis – to be determined (selenium, boron, etc.)

[3] Central Valley Project Baseline Water Quality Monitoring Program; full Title 22 organic and inorganic compounds, plus bacterial. Subject to funding.

[4] Nutrient Series are nitrate, ammonia, total Kjeldahl nitrogen, total phosphate, and ortho phosphate required by the Waste Discharge Permit for Grassland Bypass Project. Nutrient Series sampling is required monthly during non-irrigation season and increases to every other week during irrigation season (March through August).

[5] Other constituents include bacteria and molybdenum.

Deleted: , trace elements, total organic carbon, and other minerals

*****the site list does not include any sites within the City of Fresno and should note that the parameters may be adjusted based on findings from the 2009 Interim Flow monitoring*****

3.0 Study Methods and Materials

3.1 Monitoring Design

The objectives of this monitoring plan follow the goals of the Settlement (see Appendix 1). The primary objective of this water quality monitoring plan is to obtain high quality data to support the river restoration effort. We intend to make these data readily available on the SJRRP Website and compatible for other data libraries (SWAMP).

The SJRRP water quality monitoring plan is based on the following hypothesis:

- The SJRRP Interim Flows will be sufficient to meet life history requirements for spring- and fall-run Chinook salmon in the San Joaquin River between Friant Dam and the confluence with the Merced River.

Specific questions that this monitoring program will answer include:

- ?
- ?

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Reclamation will be responsible for the purchase and use of all materials associated with this monitoring plan. Most sampling equipment, including autosamplers and field sondes, will be owned and operated by Reclamation staff. Reclamation's Quality Assurance Officer will be responsible for training of all field staff and verification of methods and results.

3.2 Indicators and Measurement Parameters

The following sections describe the parameters for real-time and laboratory measurement of water quality, as well as methods for quality control, data management, and data reporting.

Real-Time Water Quality Monitoring Parameters

Parameters that will be monitored on a real-time basis at the stations discussed above for the SJRRP water quality monitoring plan are described below. Methods of measurement, along with range, resolution, and accuracy of specified sensors are provided in Table 4-1.

Temperature

Temperature is a physical property of a system measured in degrees Fahrenheit (ºF) or Celsius (ºC). Temperature is a critical parameter for various life stages of salmonids.

Salinity

Salinity is a measure of dissolved elements in water. It is the sum weight of many different elements within a given volume of water, reported in milligrams per liter (mg/L) or parts per million (ppm). Salinity is an ecological factor of considerable importance, influencing the types of organisms, such as plants and fish, that live and grow in a body of water. Salinity can be estimated by measuring the specific conductance (SC) of water.

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Dissolved Oxygen

In aquatic environments, DO is a measure of the amount of oxygen (O_2) dissolved in water. Super saturation can sometimes be harmful for organisms and can cause decompression sickness. Lack of dissolved oxygen is also harmful. DO is measured in standard solution units such as millimoles O_2 per liter (mmol/L) or milligrams O_2.

pH

The property of pH is a measure of the acidity or alkalinity of a solution given by the concentration of hydrogen ions. Values of pH in water are commonly in the range 0 to 14 units. Aqueous solutions at 25°C with a pH of less than 7 are considered acidic, while those with a pH of greater than 7 are considered basic (alkaline). When a pH level is 7.0, it is defined as “neutral” at 25°C. The pH reading of a solution is usually obtained by comparing unknown solutions to those of known pH.

Turbidity

Turbidity is the cloudiness or haziness of a fluid, caused by individual particles (suspended solids) that are generally invisible to the naked eye, similar to smoke in air. The measurement of turbidity is a key test of water quality.

Chlorophyll

Chlorophyll, in various forms, is bound within the living cells of algae and other phytoplankton found in surface water. Chlorophyll is a key biochemical component in the molecular apparatus that is responsible for photosynthesis, the critical process in which the energy from sunlight is used to produce life-sustaining oxygen. In the photosynthetic reaction, carbon dioxide is reduced by water, and chlorophyll assists this transfer.

Algae refer to simple aquatic organisms, such as seaweed, pond scum, and plankton, that are plantlike and contain chlorophyll. For *in-situ* monitoring, the measured parameter is the chlorophyll contained within the phytoplankton.

Monitoring chlorophyll levels is a direct way of tracking algal growth as an indicator organism for the health of a particular body of water.

When algae populations bloom, then crash and die in response to changing environmental conditions, they deplete DO levels – a primary cause of most fish kills. High levels of nitrogen and phosphorus can be indicators of pollution from manmade sources, such as septic system leakage, poorly functioning wastewater treatment plants, or fertilizer runoff. Thus, chlorophyll measurement can be used as an indirect indicator of nutrient levels.

The most widely used measure of phytoplankton biomass is chlorophyll a. It has several advantages as a measure of phytoplankton biomass, including (1) the measurement is relatively simple and direct, (2) it integrates cell types and ages, (3) it accounts to some extent for cell viability, and (4) it can be quantitatively coupled to important optical characteristics of water.

Table 2. Real-Time Monitoring Physical Parameters

Parameter	Temperature
Method	Digital thermometer (YSI 6600 sonde)
Range	-5 to +45 ºC
Resolution	0.01 ºC
Accuracy	± 0.15 ºC

Parameter	Salinity – Specific Conductance
Method	Conductivity meter (YSI 6600 sonde)
Range	0 to 100 mS/cm
Resolution	0.001 to 0.1 mS/cm (range-dependent)
Accuracy	± 0.5%, ±0.1 mS/cm

Parameter	Dissolved Oxygen
Method	Digital probe (YSI 6600 sonde)
Range	0 to 50 mg/L
Resolution	0.01 mg/L
Accuracy	0 to 20 mg/L: ± 2% of reading or 0.2% mg/L 20 to 50 mg/L%: ± 6% of reading

Parameter	pH
Method	Digital probe (YSI 6600 sonde)
Range	0 to 14 units
Resolution	0.01 unit
Accuracy	± 0.2% unit

Parameter	Turbidity
Method	Turbidity meter (YSI 6600 sonde)
Range	0 to 1,000 NTU
Resolution	0.1 NTU
Accuracy	± 5% of reading or 2 NTU
Depth	200 feet

Parameter	Chlorophyll
Method	Digital sensor (YSI 6600 sonde)
Range	0 to 400 µg/L
Resolution	0.1 µg/L Chlorophyll; 0.1% FS
Depth	200 feet

Key:
ºC = degrees Celsius
FS = fluorescence
µg/L = micrograms per liter
mg/L = milligrams per liter
mS/cm = milliSiemens per centimeter
NTU = Nephelometric turbidity unit

Sampling For Laboratory Analyses of Water Quality

The following sections describe constituents for laboratory analyses of water quality, as well as methods for water quality sampling and chain of custody documentation.

Constituents

The complete list of constituents to be measured at various sites along the SJRRP study area will be determined according to the needs of the scientists handling the fish restoration. Parameters may include selenium, mercury, boron, nutrients, and other compounds that cannot be measured with field sensors.

Sampling methods

Grab samples will be collected using a stainless steel sampling device. This device is a cage on a pole that holds the sampling bottle. Grab samples will be collected from the stream bank directly into sample bottles or into a churn-splitter. This technique is for samples collected weekly or less frequently. Each sample will be collected in a specified manner.

Depth/width integrated samples will be collected where parameters may not be evenly mixed across the river channel. This method involves collecting samples at regular intervals across the channel.

Time composite samples will be collected using an autosampler. Daily composite samples will consist of up to eight subsamples taken per day and mixed into one sample. Weekly composite samples will consist of seven consecutive daily subsamples mixed into one sample. Reclamation and the Central Valley Regional Water Quality Control Board (Central Valley RWQCB) currently use Sigma brand autosamplers to collect daily composite samples from the Delta-Mendota Canal, San Luis Drain, and San Joaquin River at Crows Landing.

Comment [RS3]: At Crows Landing we only collect two samples per day because the batteries will not support the collection of more samples per day.

Chain of Custody documentation

Chain of custody (COC) documentation will be initiated during sample collection for all matrices and maintained throughout analytical and storage processes. All individuals transferring and receiving samples will sign, date, and record the time on the COC that the samples are transferred. Each agency will follow its established COC procedures and use various agency and laboratory COC records.

Laboratory COC procedures are described in each laboratory's Quality Assurance Program Manual, which is kept on file with the Quality Control Officer (QCO). Laboratories must receive the COC documentation submitted with each batch of samples and sign, date, and record the time the samples are transferred. Laboratories will also note any sample discrepancies (e.g., labeling, breakage). This documentation must be maintained for a minimum of 5 years. After generating the laboratory data report for the client, samples will be stored for a minimum of 30 days in a secured area prior to disposal.

3.3 Data Analysis and Assessment

Review by interagency water quality monitoring subgroup. All data will be reviewed to ensure the water quality is supporting the beneficial uses outlined by the settlement and the Basin Plan.

Regular meetings will be held to present and review data. Where potential water quality problems are identified, this information will be provided to the appropriate SJRRP Program Managers to ensure follow-up monitoring and program modifications as appropriate.

Comment [RS4]: This is discussed later in the document.

Deleted: Annual meetings to analyze trends, write annual report

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3.4 Data Collection and Frequency of Sampling

Interim Flow water will be tracked and sampled at several sites along the river. The foundation of this monitoring program will be a series of in-situ sondes located along the study area that will provide real-time measurements of physical conditions (Table 1). The sondes will measure stage (depth), flow, specific conductance, temperature, dissolved oxygen, and pH.

Routine samples of water will be collected at the sites listed in Table 2 for analyses of various parameters critical to fish habitat. The sample locations, frequency, and analytical parameters will be is based on initial finding from the 2009 Interim Flow Water Quality Study and the requirements of regulations and fish management.

3.5 Spatial and Temporal Scale

Reach 1

Tables 4 and 5 describe locations for water quality monitoring within Reach 1, which are shown in Figure 3.

Table 4. San Joaquin River at Friant Dam

Description	**The station is located at the base of Friant Dam.**
Purpose	To measure the initial volume, temperature, and quality of water released from the dam into the river for riparian diversions and the SJRRP.
Responsible Agency	Reclamation, Friant Dam office, is responsible for operation of the dam and will maintain this water quality station.
Existing Equipment	Stage recorder, multi-parameter sonde, linked to CDEC via satellite.

Note: The sonde will be installed end of the wall between the river valves and the spillway.

Table 5. San Joaquin River below Friant Dam

Description	**The station will be located near the existing USGS flow monitoring site in Lost Lake Park.**
Purpose	To measure the quality of water released from the dam into the river for riparian diversions and the SJRRP.
Responsible Agency	Reclamation, Friant Dam office, will maintain this monitoring station. USGS will continue to measure flow. Reclamation, Environmental Monitoring Branch (MP-157), will collect water samples; if needed, an autosampler will be operated here.
Existing Equipment	Stage recorder, linked to CDEC via satellite.
Revision	Add autosampler, multiple parameter sonde.

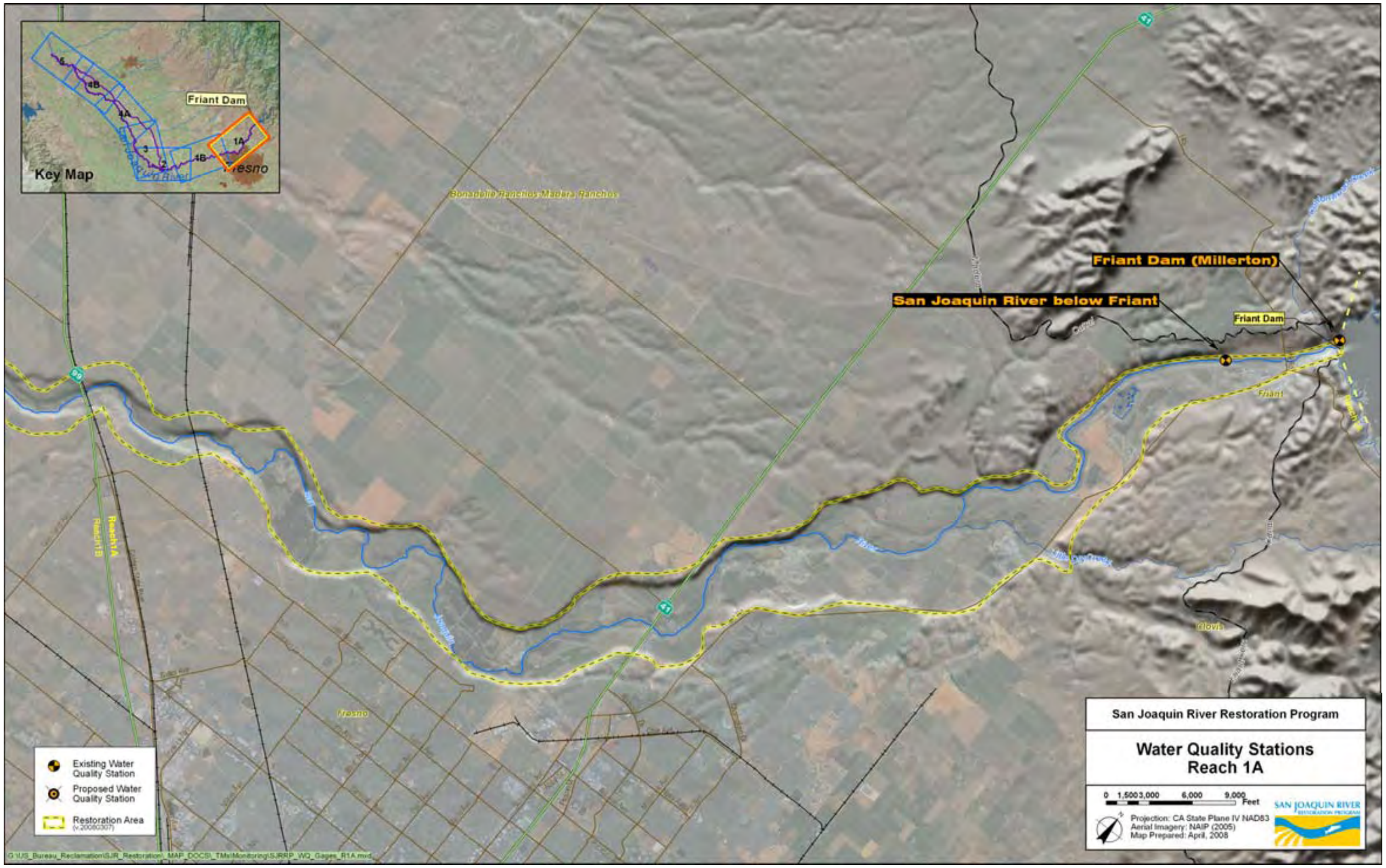

Figure 3. Reach 1 Water Quality Monitoring Stations

Reach 2 ***skipping a location within the City of Fresno***

Water quality monitoring locations within Reach 2 are described in Tables 6 and 7, and shown in Figure 4.

Table 6. San Joaquin River at Gravelly Ford

Description	**This site is located about 40 miles downstream from Friant Dam, where the last riparian diversion occurs; from here, the Restoration Flows will sustain the river.**
Purpose	To measure the volume and temperature of water in the river.
Responsible Agency	Reclamation, Friant Dam office.
Existing Equipment	Stage recorder, multiple parameter sonde, linked to CDEC via satellite.

Table 7. San Joaquin River Below Chowchilla Bifurcation

Description	**This site is located about 54 miles downstream from Friant Dam, next to the Chowchilla Bypass. This is a flood control channel and inlet to the Mendota Pool.**
Purpose	To measure the volume and temperature of water in the river.
Responsible Agency	Reclamation, Friant Dam office.
Existing Equipment	Stage recorder, multiple parameter sonde linked to CDEC via satellite.

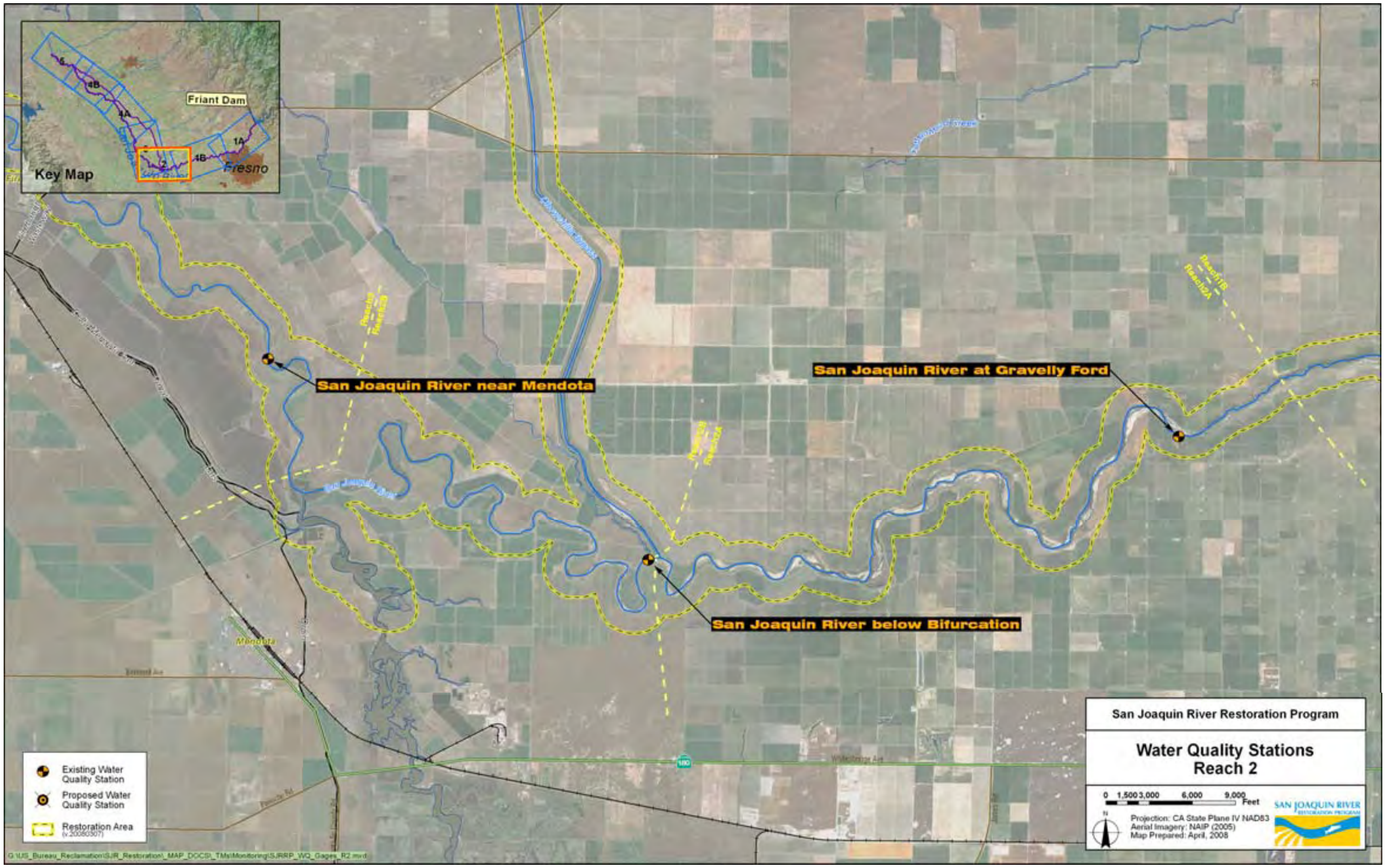

Figure 4. Reach 2 Water Quality Monitoring Stations

Reach 3

Table 8 describes the location of a water quality monitoring station for the SJRRP in Reach 3, shown in Figure 5. In addition to the station described below, Reclamation will operate two water quality stations that measure the quality of water in the Mendota Pool: Delta-Mendota Canal Check 21, and Central California Irrigation District Main Canal headworks at Bass Avenue. Data from these sites will be integrated into the SJRRP water quality monitoring plan.

Table 8. San Joaquin River near Mendota (below Mendota Dam)

Description	**The Mendota Dam impounds water from the Kings River, San Joaquin River, and Delta-Mendota Canal. The blend of waters varies in volume and quality. Possible site for an autosampler.**
Purpose	To measure the volume, temperature, and quality of water in the river.
Responsible Agency	Reclamation will operate real-time equipment to measure water quality in the Mendota Pool. Other water quality samples will be collected here.
Existing Equipment	Stage recorder, linked to CDEC.
Revision	Add multiple parameter sonde and autosampler; connect power supply.

Note: Assume this site will be downstream from the proposed Mendota Pool Bypass channel.

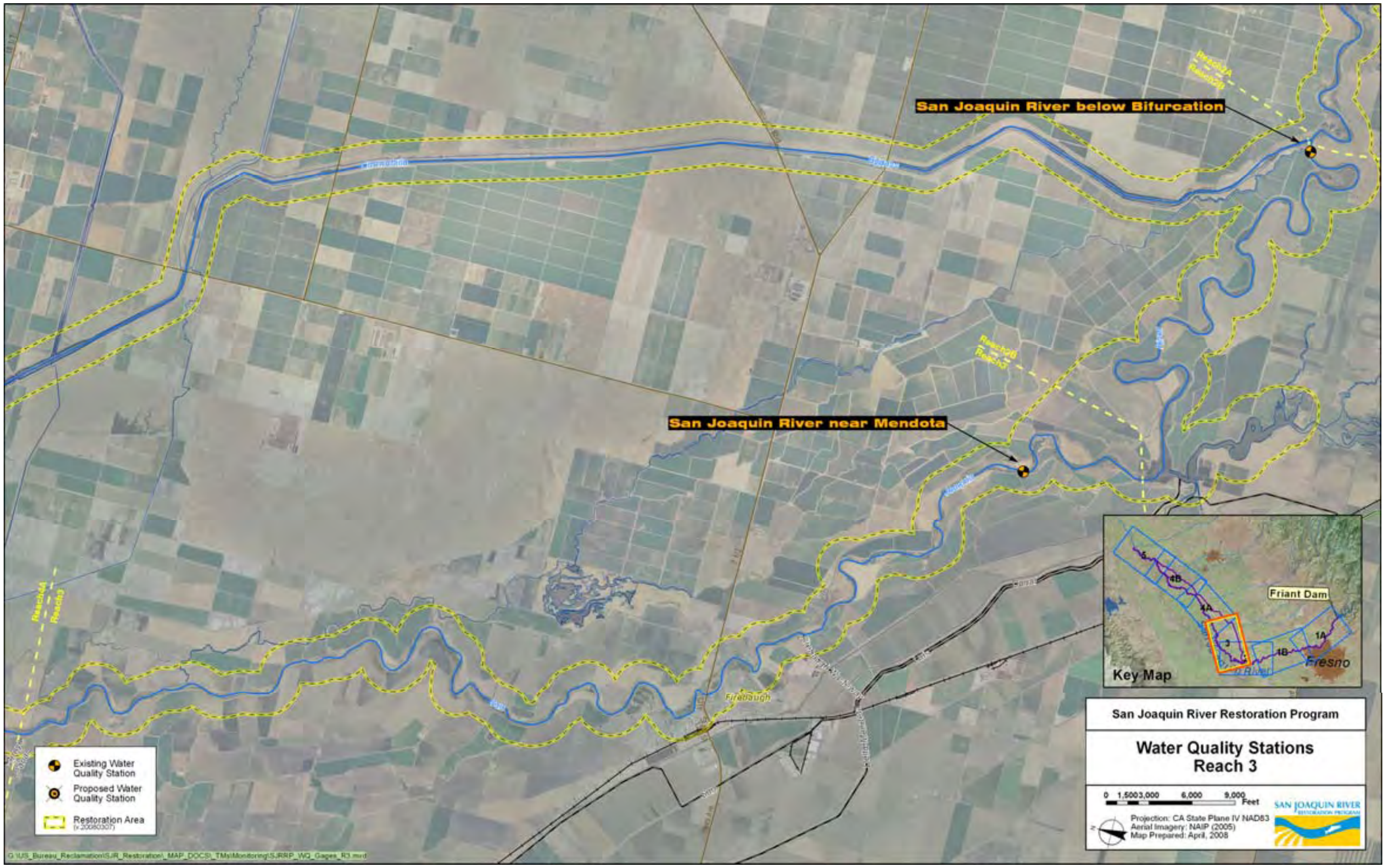

Figure 5. Reach 3 Water Quality Monitoring Stations

Reach 4

The water quality monitoring stations for the SJRRP in Reach 4 are described in Tables 9 and 10, and shown in Figure 6. In addition to the sites described below, flow and water quality data collected by the USGS and Central Valley RWQCB for Salt Slough at Lander Avenue may be used by the SJRRP. The USGS measures flow, electrical conductivity (EC), and temperature at this site, and the Central Valley RWQCB collects water samples each week to analyze selenium and boron. DWR collects flow data in the River at Lander Avenue (Highway 165).

Table 9. San Joaquin River Below Sack Dam

Description	**This is a point of diversion of water to agriculture and wildlife refuges. SJRRP flows will sustain the river below this point.**
Purpose	To measure the volume, temperature, and water quality in the river.
Responsible Agency	DWR
Existing Equipment	Install flow measurement device and multiple parameter sonde.

Table 10. San Joaquin River at the Top of Reach 4B

Description	**The river at this site receives water from the east via the Mariposa and Eastside bypasses, and from the west via Salt Slough.**
Purpose	The quality of the blended waters may be harmful to migrating fish.
Responsible Agency	TBD *
Existing Equipment	None.
Revision	Install flow measurement devices and multiple parameter sonde.

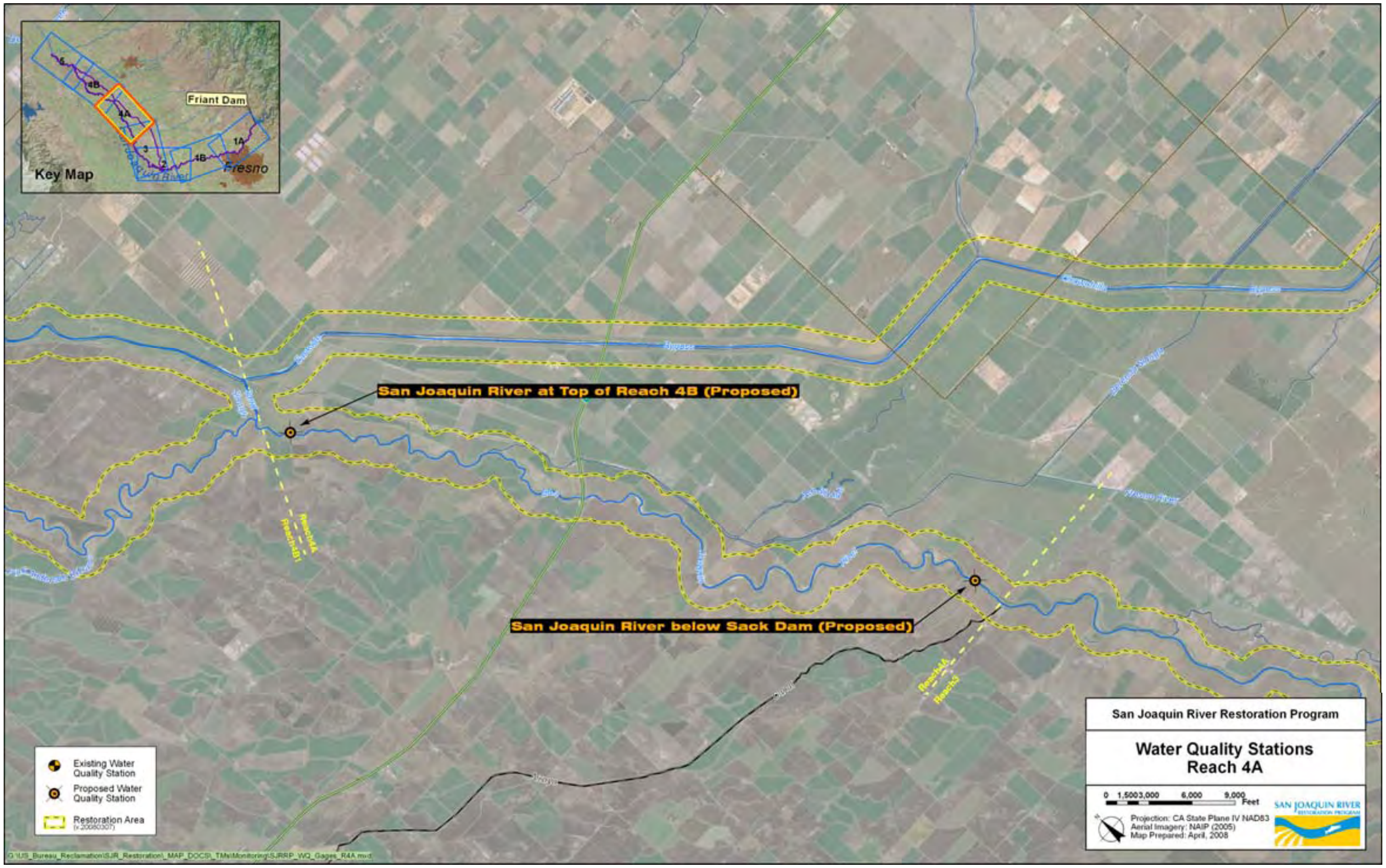

Figure 6. Reach 4 Water Quality Monitoring Stations

Reach 5

Tables 11 and 12 describe locations of water quality monitoring stations for the SJRRP in Reach 5. The locations of these stations are shown in Figure 7. Water quality data collected by other agencies at tributaries to the San Joaquin River near Reach 5 may be used by the SJRRP. These sites include Mud Slough near Gustine, and Newman Wasteway. At Mud Slough near Gustine, USGS measures EC and temperature, while Central Valley RWQCB collects water samples each week to analyze selenium and boron. When water is released from the Delta-Mendota Canal to the San Joaquin River through the Newman Wasteway, Reclamation monitors water quality and toxicity in the Newman Wasteway and San Joaquin River.

Table 11. San Joaquin River at Fremont Ford Bridge

Description	**The river at this site receives water from local farms and refuges and Salt Slough (Grassland Bypass Project Station G).**
Purpose	To measure flow and quality of water in Reach 5.
Responsible Agency	Flow, EC, temperature: USGS Other parameters: Central Valley RWQCB (GBP)
Existing Equipment	GOES station, linked to CDEC.
Revision	Upgrade existing multiple parameter sonde to measure turbidity and dissolved oxygen.

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Note:
Flow and water quality separately funded by Reclamation and Central Valley RWQCB, respectively. Based on available funds, the Grassland Bypass Project will continue to monitor flow, salinity, temperature, selenium, and nutrients. These data will be incorporated in the SJRRP water quality monitoring program.

Table 12. San Joaquin River at Hills Ferry

Description	**The site is located at Hills Ferry, about one half-mile upstream from the confluence of the Merced River.**
Purpose	This is where the net volume of water attributed to SJJRP Flows will be measured. Many biological and water quality parameters have been measured here for with the Grassland Bypass Project.
Responsible Agency	Flow, EC, temperature: USGS
Existing Equipment	GOES station, linked to CDEC; autosampler site

Note: Weekly grab samples for selenium and boron are collected for Grassland Bypass Project.

Comment [RS5]: CVRWQCB does not sample at this location because of a reach of the Merced River that hits SJR above this site during high flows.

Deleted: Other parameters: Central Valley RWQCB (SWAMP)

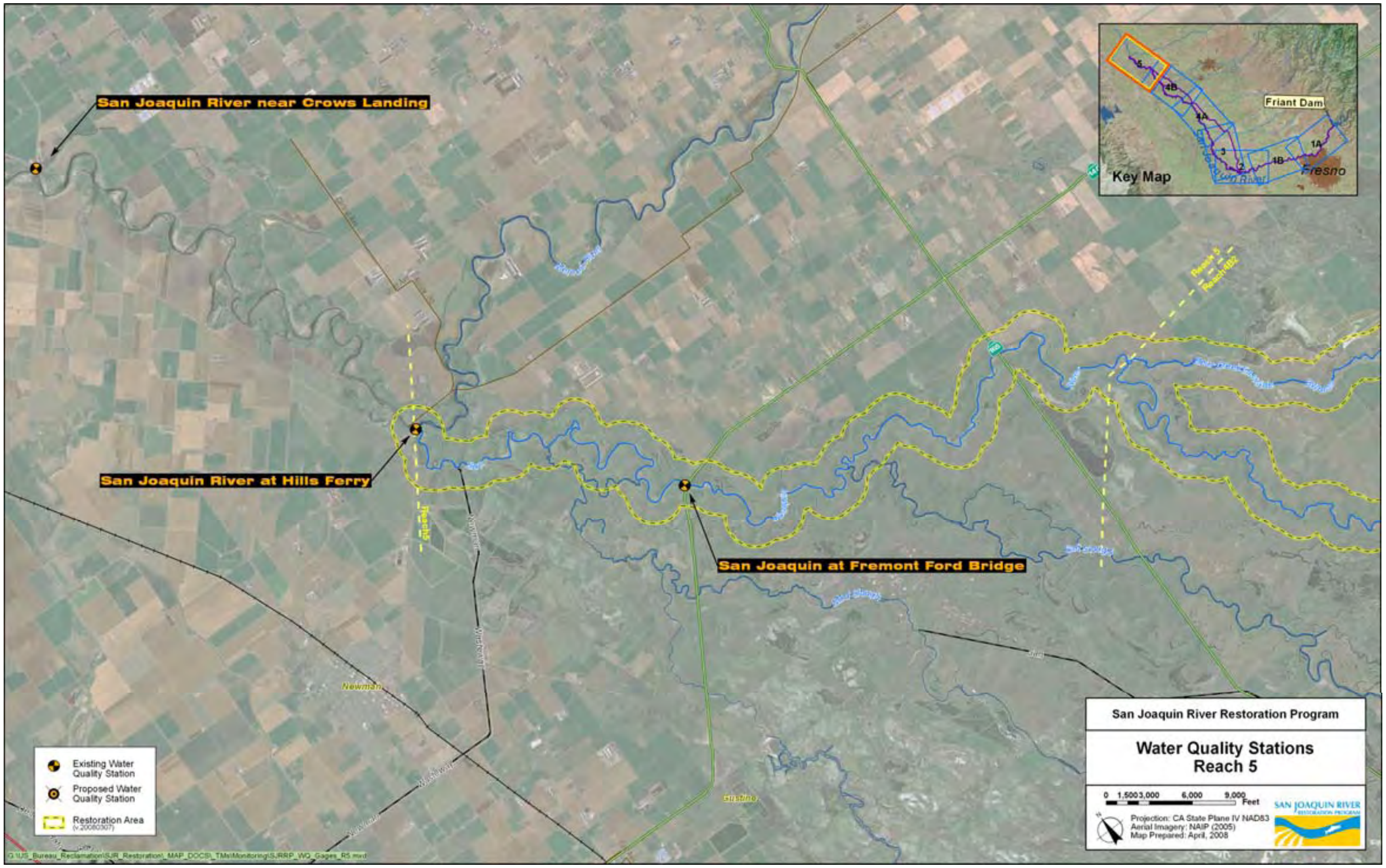

Figure 7. Reach 5 and San Joaquin River Below Merced River Water Quality Monitoring Station

San Joaquin River Below Merced River

Table 13 describes a San Joaquin River water quality monitoring location located below the Merced River confluence, downstream from Reach 5. This water quality monitoring station is shown in Figure 7.

Table 13. San Joaquin River at Crows Landing

Description	**San Joaquin River below Merced River (Grassland Bypass Project Station N).**
Purpose	Assess net benefit to lower San Joaquin River from SJRRP; compare with long history of flow and water quality data.
Responsible Agency	Flow, EC, temperature: USGS Water quality: Central Valley RWQCB (GBP)
Existing Equipment	GOES station, linked to CDEC, autosampler on dock.

Note: Water quality separately funded by Reclamation and Central Valley RWQCB. Based on available funds, the Grasslands Bypass Project will continue to monitor flow, salinity, temperature, selenium, nutrients, and other parameters here. These data will be incorporated in the SJRRP water quality monitoring plan.

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*****You mention early on that additional data may be utilized to review overall impact to SJR Basin. Shouldn't there be a notation here indicating who the data may come from and how it will be incorporated???*****

3.6 Data Management

Each agency and contractor collecting data for the SJRRP(??) shall be responsible for its own data reduction (analysis), internal data quality control, data storage, and data retrieval. Each will provide its data to the independent data management organization (DMO) for compilation, publication and distribution of printed copies, and posting of reports on the SJRRP web site.

The DMO will specify the format for all reports, data tables, graphics, and charts. The DMO will specify how raw data will be presented by the collecting agencies, and how the final reports will be published (e.g., Adobe PDF). ***??what agreement is in place from other agencies to meet this requirement??***

All data collected under the SJRRP water quality monitoring plan will be compatible with the 2005 Surface Water Ambient Monitoring Program (SWAMP) Information Management Plan.

The DMO will develop and maintain a Web site for the SJRRP flow and water quality monitoring plan. The Web site will feature an interactive graphic that will show the current flow and temperature conditions along the river in real-time. The Web site will also provide maps, photographs, project documents, and data for downloading. In addition, the site will feature a reference library and provide a forum for public discussion and comments.

Data will be labeled according to accuracy and degree of verification:

- Real-Time – Raw data from in-situ sensors; preliminary and subject to change upon review and calibration by the collecting agency
- Provisional Data - Data that have been reviewed by the collecting agency but still may be changed pending reanalysis or statistical review
- Laboratory Data – Data produced by the laboratory following laboratory QA/QC protocols

4.0 Coordination and Review Strategy

I think this is where you might want to mention a monitoring subgroup and the participants. This would also be the place to mention the potential for adaptive changes to monitoring plan based on findings.

Deleted: Interagency review

Deleted: Annual synthesis reports¶

Formatted: Bullets and Numbering

5.0 Quality Assurance

Quality control (QC) is the overall system of technical activities that measure the attributes and performance of a process, item, or service against defined standards to verify that stated requirements are met.

Quality assurance (QA) is an integrated system of management activities involving, planning, implementation, documentation, assessment, reporting, and quality improvement to ensure that a process, item, or service is of the type and quality needed and expected by the customer.

A Quality Assurance Project Plan will be written for the SJRRP water quality monitoring plan. The QAPP will be administered by the Quality Control Officer for Reclamation. QA objectives will be used to validate the data for this project. The data will be accepted, rejected, or qualified based on how sample results compare to established acceptance criteria. {citation for Reclamation QA/QC manual}

The precision, accuracy, and contamination criteria will be used by the QCO to validate the data for this project. The criteria will be applied to the blind external duplicate/split, blank, reference, or spiked samples submitted with the production samples to the analytical laboratories by the participating agencies to provide an independent assessment of precision, accuracy, and contamination.

Laboratories analyze their own QC samples with the client's samples. Laboratory QC samples, including laboratory fortified blanks, matrix spikes, duplicates, and method blanks, assess precision, accuracy, and contamination. Laboratory QC criteria are stated in the analytical methods or determined by each laboratory. Since internal control ranges are often updated in laboratories based on instrumentation, personnel, or other influences, it is the responsibility of the QCO to verify that these limits are well documented and appropriately updated during system audits. The preferred method of reporting the QC results is for the laboratory to provide a QC summary report with acceptance criteria for each QC parameter of interest.

For water and sediment results, the QCO will use a statistical program to determine if current concentrations for parameters at given sites are consistent with the historical data at these sites. A result is determined to be a historical outlier if it is greater than 3 standard deviations from the average value for the site. The presence of an outlier could indicate an error in the analytical process or a significant change in the environment.

Samples must be prepared, extracted, and analyzed within the recommended holding time for the parameter. Data may be disqualified if the sample was analyzed after the holding time expires.

Completeness refers to the percentage of project data that must be successfully collected, validated, and reported to proceed with its intended use in making decisions.

Constraints with regard to time, money, safety, and personnel were some of the factors in choosing the most representative sites for this project. Monitoring sites have been selected by considering the physical, chemical, and biological boundaries that define the system under study.

Sites also were selected to be as representative of the system as possible. However, the ad hoc Data Collection and Review Team (DCRT) will continue to evaluate the choice of the sites with respect to their representativeness and will make appropriate recommendations to the Water Quality Monitoring Group given a belief or finding of inadequacy.

Comparability between each agency's data is enhanced through the use of Standard Operating Procedures (SOP) that detail methods of collection and analysis. Each agency has chosen the best available protocol for the sampling and analyses for which it is responsible based on the agency's own expertise. Audits performed by the QCO will reinforce the methods and practices currently in place and serve to standardize techniques used by the agencies.

6.0 Reporting

Preliminary real-time data will be posted on the SJRRP Web site by the DMO. The data will be clearly marked to be preliminary and subject to revision. The purpose of these data is to provide an instant estimate of field conditions. The DMO will maintain a graphic display on the Web site that will show the current volume and temperature of water at the ten monitoring locations. Real-time data will be posted on the Web site as preliminary, subject to change. The data will be available for 5 years, after which the data will be archived by Reclamation and provided on request.

The DMO will prepare quarterly data compilation reports that will list mean daily available flow and temperature at the monitoring locations, plus all available water quality results. The report will include summary calculations, charts, and graphics to show cumulative effects. Provisional data will be posted on the SJRRP Web site by the collecting agencies in quarterly data summary reports.???Who will be paying for this work, especially if the DMO is requiring a specific format??? The data will be subject to revision. The purpose of these data is to provide reliable information for analyzing trends and changes in water quality in the river. The DMO will maintain a database for download by interested parties.

Each quarterly data report will be reviewed by the DCRT ***who is this?***, then posted on the SJRRP Web site and distributed to the public. Quarterly data reports will be available for download by any interested party for the entire term of the SJRRP.

Final data will be completely verified by the respective collecting agencies and published in the Annual Synthesis Report. The DCRT will collaborate to prepare the Annual Synthesis Report, which will synthesize all flow and water quality monitoring data for the

SJRRP, and will provide a scientific review of the data to determine how the SJRRP is meeting its objectives. The Annual Synthesis Report must be completed within 3 months of the end of a calendar year, and will be published on the Web site and made available for download by any interested party for the entire term of the SJRRP.

Comment [RS6]: Is this standard language? 6 months seems more feasible for the annual reports.

Appendix A

Excerpts from the Settlement Agreement

Paragraph 15, line 22, page 18 of the Settlement explains implementation of the Interim Flows Program:

> *15. Prior to the commencement of full Restoration Flows pursuant to this Settlement, the Parties agree that the Secretary shall begin a program of interim flows, which will include releases of additional water from Friant Dam commencing no later than October 1, 2009, and continuing until full Restoration Flows begin. Flows released according to the provisions of this Paragraph 15 shall be referred to as "Interim Flows." The Restoration Administrator, in consultation with the Technical Advisory Committee, the Secretary, and other appropriate Federal, State and local agencies, shall develop and recommend to the Secretary implementation of a program of Interim Flows in order to collect relevant data concerning flows, temperatures, fish needs, seepage losses, recirculation, recapture and reuse. Such program shall include releasing the flows identified in Exhibit B for the appropriate year type to the extent that such flows would not impede or delay completion of the measures specified in Paragraph 11(a), or exceed existing downstream channel capacities. To the extent that any gauging locations identified in Paragraph 13(g) are not available to measure flows due to in-channel construction related to Paragraph 11 improvements and until such gauging locations are installed, Interim Flows will be measured by establishing any necessary temporary gauging locations or by manual flow measurements for the purposes of collection of relevant data. The Parties anticipate that a program of Interim Flows would include:*
>
> *(a) In 2009, release flows from October 1 through November 20 of a timing and magnitude as defined in the appropriate year type hydrograph [flow schedule] specified in Exhibit B, and without exceeding the then existing channel capacities;*
>
> *(b) In 2010, release flows from February 1 through December 1 of a timing and magnitude as defined by Exhibit B for the appropriate year type, and without exceeding the then existing channel capacities;*
>
> *(c) In 2011 and 2012, assuming in-channel construction begins May 1, release flows from February 1 through May 1 of a timing and magnitude as defined by Exhibit B for the appropriate year type, and without exceeding the then existing channel capacities. From May 1 through September 1, release flows to wet the channel down to the*

Chowchilla Bifurcation Structure to collect information regarding infiltration losses; and

(d) In subsequent years, if the highest priority channel improvements identified in Paragraph 11(a) are not completed, release flows for the entire year of a timing and magnitude as defined by Exhibit B for the appropriate year type, without exceeding the then existing channel capacities or interfering with any remaining in-channel construction work on the highest priority Paragraph 11 improvements.

(e) For purposes of implementing the Interim Flows specified in 15(a) through 15(d), the Secretary, in consultation with the Restoration Administrator, shall determine the then existing channel capacity and impact of Interim Flows on channel construction work."

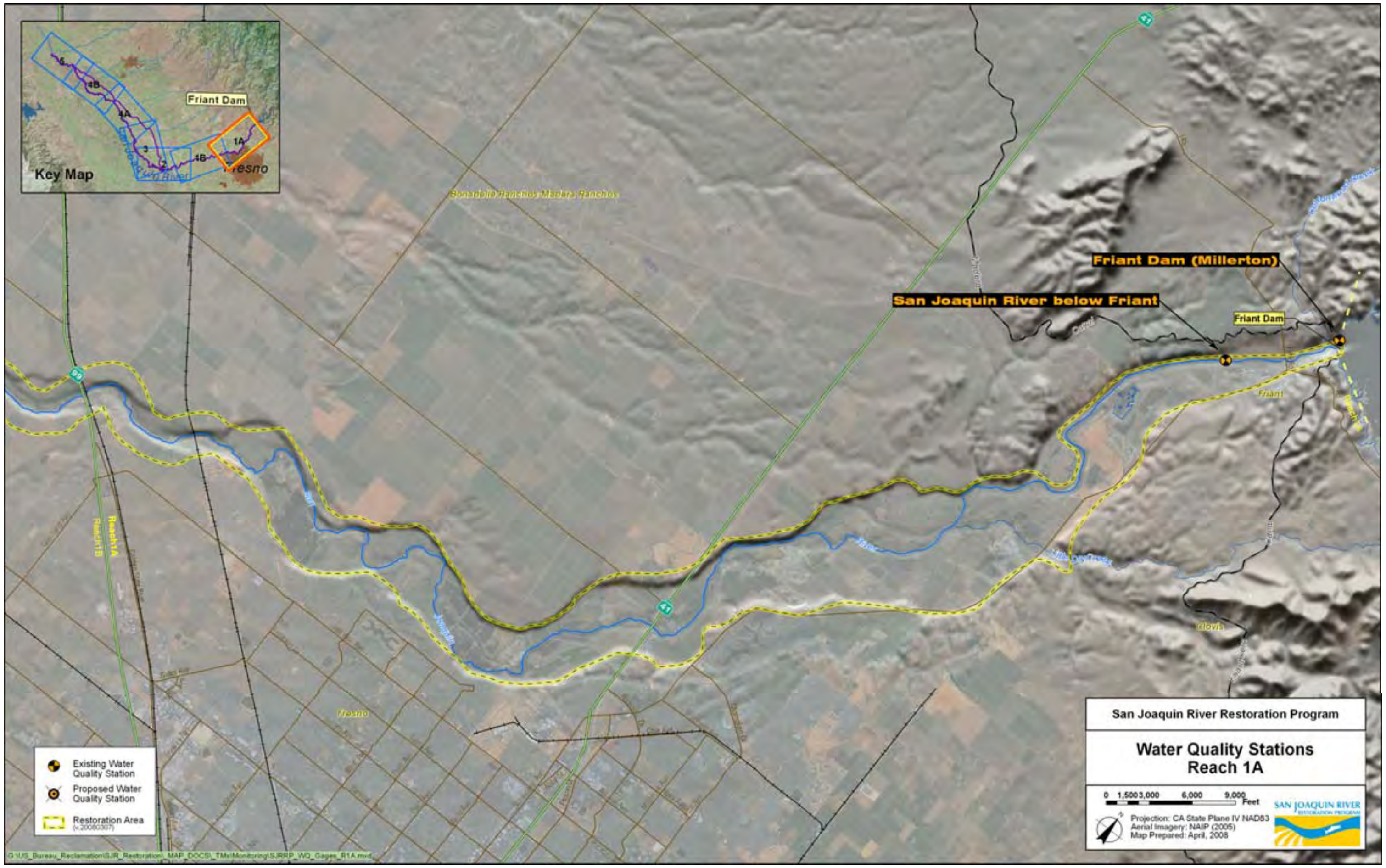

Figure 3. Reach 1 Water Quality Monitoring Stations

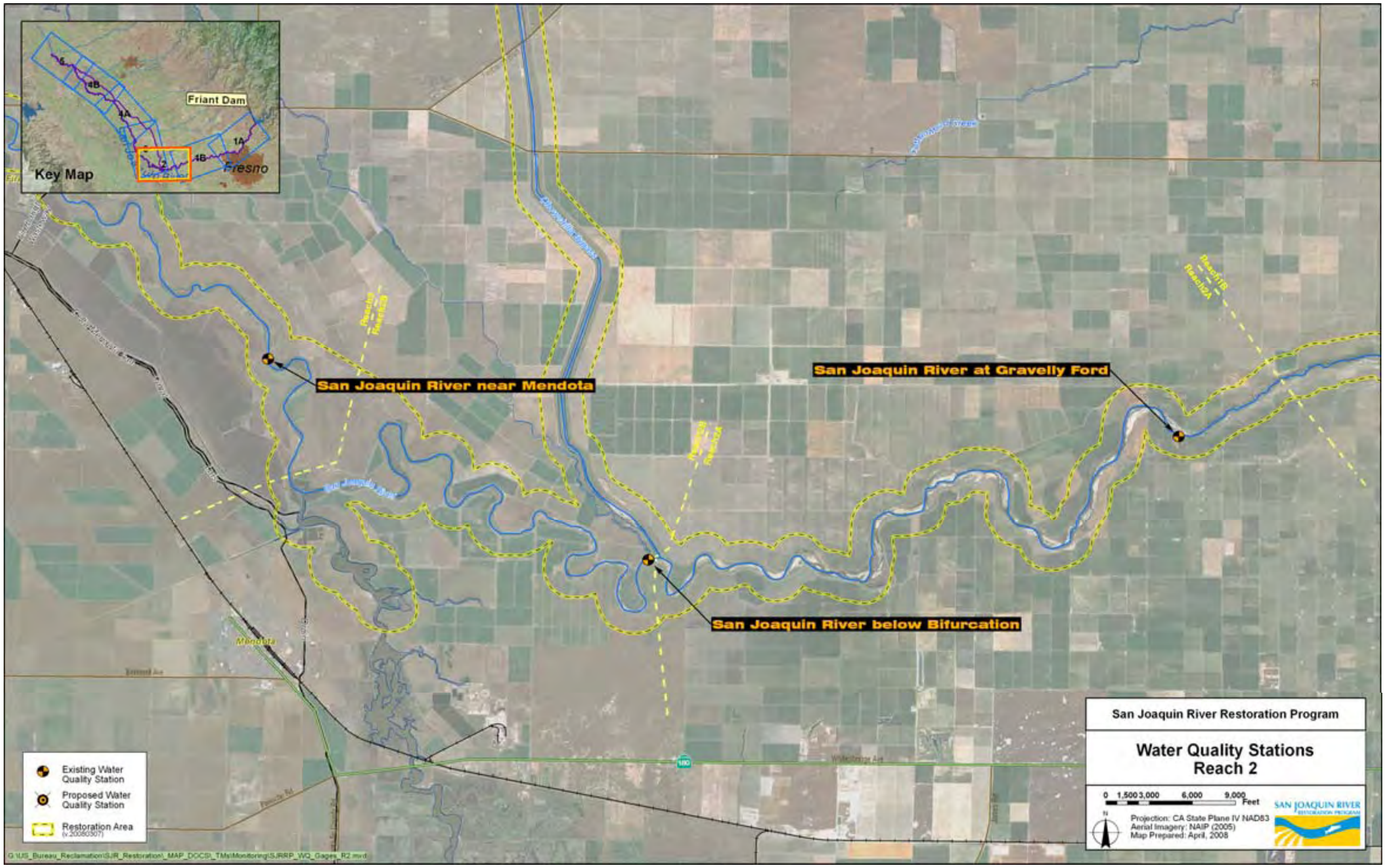

Figure 4. Reach 2 Water Quality Monitoring Station

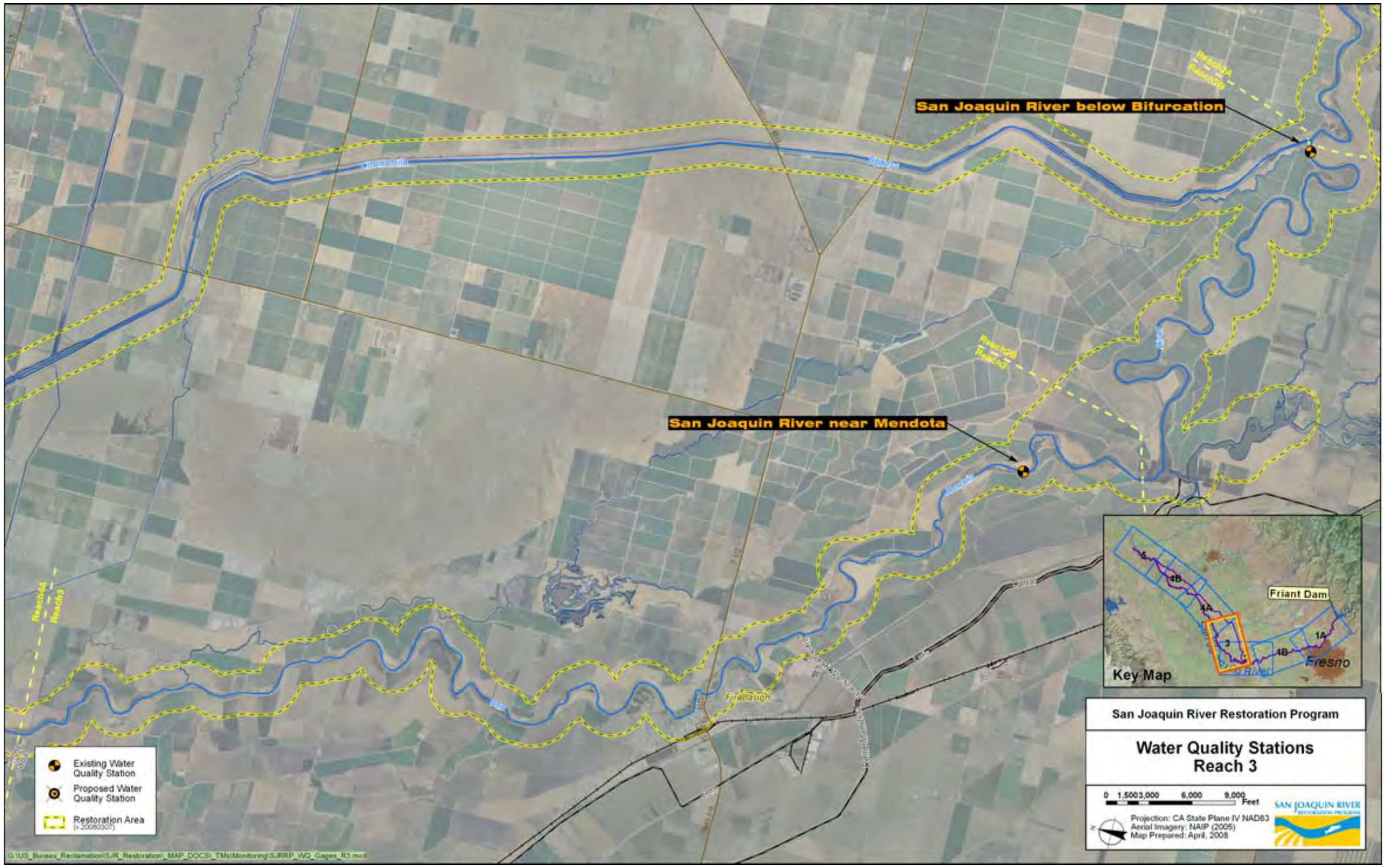

Figure 5. Reach 3 Water Quality Monitoring Stations

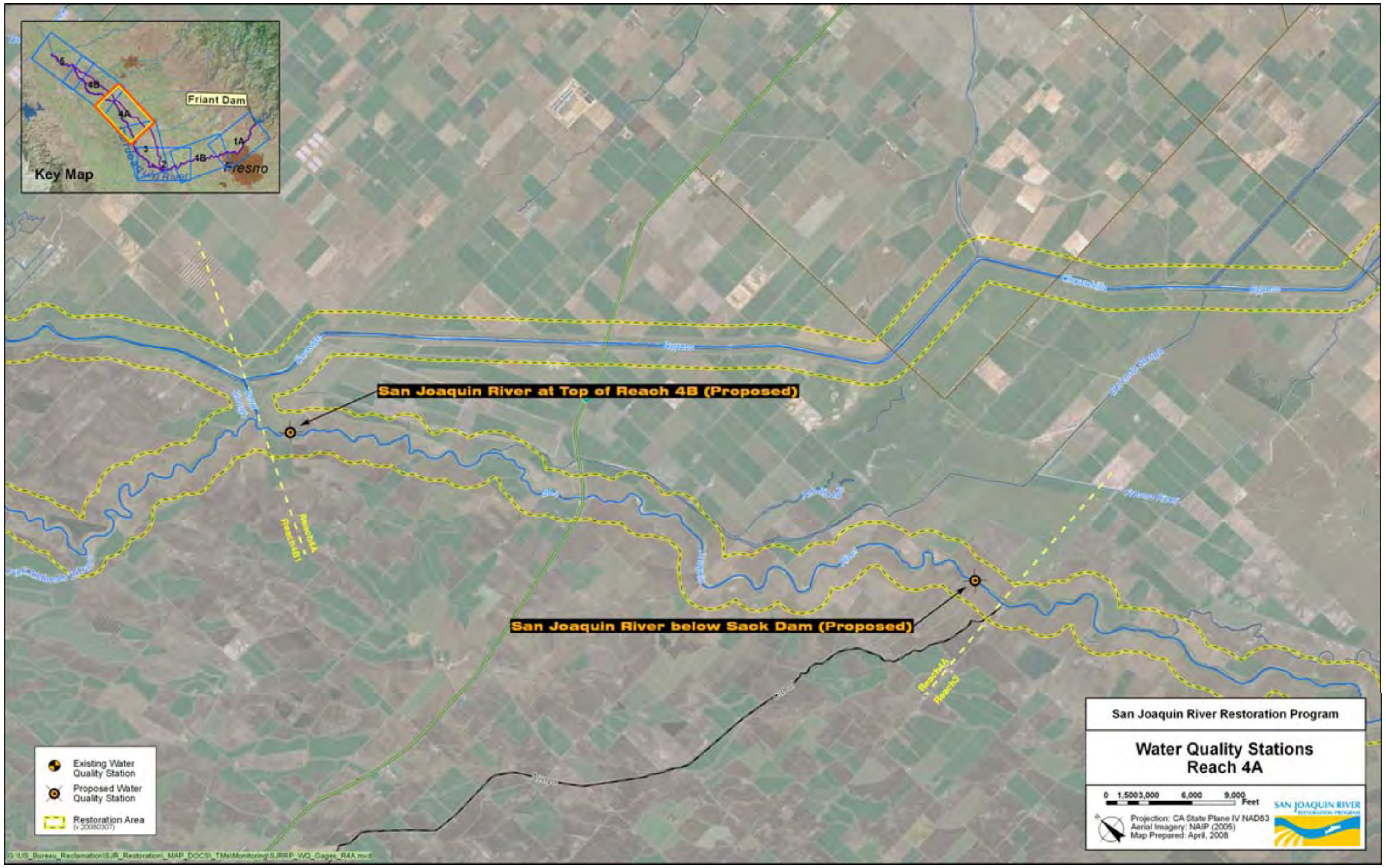

Figure 6. Reach 4 Water Quality Monitoring Station

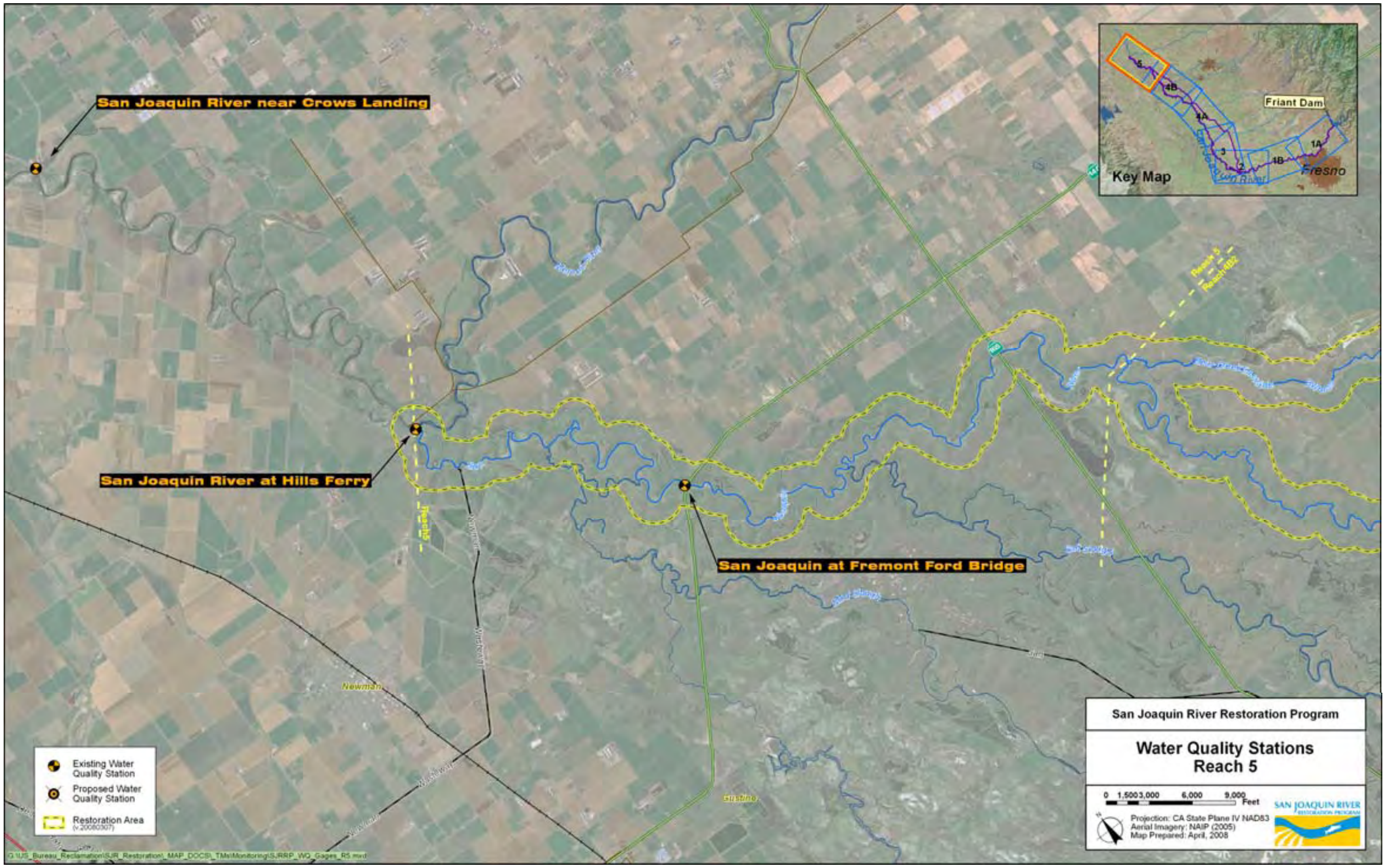

Figure 7. Reach 5 and San Joaquin River Below Merced River Water Quality Monitoring Stations

IN REPLY REFER TO:

United States Department of the Interior

BUREAU OF RECLAMATION
Mid-Pacific Regional Office
2800 Cottage Way
Sacramento, California 95825-1898

TAKE PRIDE® IN AMERICA

MP-170
PRJ-1.00

DEC 24 2009

Ms. Victoria Whitney
Deputy Director for Water Rights
Attn: Ms. Kathy Mrowka
State Water Resources Control Board
P.O. Box 2000
Sacramento, CA 95812-2000

Subject: Request for Extension for Submittal of the Water Quality Monitoring Plan Called for in Condition 22 of Order WR 2009-0058-DWR

Dear Ms. Mrowka:

I would like to extend my gratitude to the State Water Resources Control Board (State Board) in their expeditious issuance of Order WR 2009-0058-DWR (Order) for the Bureau of Reclamation, San Joaquin River Restoration Program's Water Year 2010 Interim Flows Project. We began the Interim Flow releases on October 1, 2009 and are working to implement the Interim Flows Project consistent with the Order.

Reclamation has been working diligently to implement Condition 22 of the Order, which generally requires water quality monitoring prior to and during Interim Flows releases and a Water Quality Monitoring Plan to be submitted to the State Board by January 1, 2010. With regard to the water quality monitoring, we have been coordinating with multiple State and Federal agencies and have established an Interim Flows Monitoring Working Group that meets weekly to discuss results of the Interim Flow monitoring activities, including stream flows in specific river reaches, water and sediment quality, flow schedules from Friant Dam, and groundwater monitoring. The working group is comprised of staff from the U.S. Environmental Protection Agency, National Marine Fisheries Service, U.S. Fish and Wildlife Service (FWS), Department of Water Resources (DWR), Department of Fish and Game (DFG), and Central Valley Regional Water Quality Control Board (CVRWQCB). The working group has been valuable as it has increased coordination among the agencies and allowed for quick dissemination of information related to the Interim Flows.

With regard to the water quality monitoring plan, Condition 22 of the Order states the following:

By January 1, 2010, Reclamation shall develop a monitoring plan, acceptable to the Deputy Director for Water Rights, for the releases beginning after February

1, 2010. Prior to submitting the plan to the Division of Water Rights, Reclamation shall obtain the written comments of the Central Valley Water Board, U.S. Fish and Wildlife Service, and the California Department of Fish and Game. The plan is subject to review, modification and approval by the Deputy Director for Water Rights.

A subset of the Interim Flows Monitoring Working Group was formed specifically to guide preparation of the Water Quality Monitoring Plan called for in Condition 22 of the Order. This group includes representatives from FWS, DWR, DFG, and CVRWQCB. A working draft of the Water Quality Monitoring Plan was circulated to the agencies for review and comment on December 8, 2009. Due to the holidays and the State furlough days, some agencies need additional time to review the working draft plan. Additionally, we need additional time to adequately incorporate the comments and complete the plan for submittal to the Deputy Director of Water Rights. Therefore, we would like to request an extension to the date for submitting the Water Quality Monitoring Plan to the Deputy Director. Reclamation can submit the plan on or before January 13, 2010.

We would appreciate a response to this request prior to the January 1, 2010 date stipulated in the Order. Thank you for your continued coordination and assistance in implementing the San Joaquin River Restoration Program's Water Year 2010 Interim Flows Project. Please contact me if you have any questions at 916-978-5455 or jphillips@usbr.gov.

Sincerely,

Jason R. Phillips
Program Manager

cc: Mr. Jeff McLain
U. S. Fish and Wildlife Service
2800 Cottage Way, W-1727
Sacramento, CA 95825

Ms. Karen Dulik
Department of Water Resources
3374 E. Shields Avenue
Fresno, CA 93726

Mr. Gerald Hatler
Department of Fish and Game
1234 East Shaw Avenue
Fresno, CA 93710

Ms. TJ Kopshy
Central Valley Regional Water
Quality Control Board
1685 E Street
Fresno, CA 93706

Gasdick, Alicia E

From: Phillips, Jason R
Sent: Wednesday, January 06, 2010 3:09 PM
To: Banonis, Michelle; Gasdick, Alicia E
Subject: Fw: Request for Extension for Submittal of the Water Quality Monitoring Plan in Order WR 2009-0058-DWR

FYI...

----- Original Message -----
From: Kathy Mrowka <KMROWKA@waterboards.ca.gov>
To: Phillips, Jason R; Colella, Robert F
Cc: ghatler@dfg.ca.gov <ghatler@dfg.ca.gov>; Jeff McLain; Karen Dulik <kdulik@water.ca.gov>; TJ Kopshy <tkopshy@waterboards.ca.gov>
Sent: Wed Jan 06 16:04:57 2010
Subject: Request for Extension for Submittal of the Water Quality Monitoring Plan in Order WR 2009-0058-DWR

Order WR 2009-0058-DWR, condition 22, requires the U.S. Bureau of Reclamation (Reclamation) to submit a water quality monitoring plan by January 1, 2010. The plan must be developed in consultation with the Central Valley Regional Water Quality Control Board, the U.S. Fish and Wildlife Service and the Department of Fish and Game. On December 29, 2009, the Division of Water Rights (Division) received Reclamation's December 24, 2009 request for an extension to January 13, 2010 to submit the plan. The extension was requested due to the holidays and State furlough days, resulting in some of the agencies that are reviewing the plan needing additional time to review the working draft plan. Division staff discussed the request with Victoria Whitney, Deputy Director for Water Rights on January 6, 2010. The request is granted. We will expect the plan on January 13.

Sincerely,

Katherine Mrowka, Chief
Inland Streams Unit
Division of Water Rights

(916) 341-5363
fax (916) 341-5400

Banonis, Michelle

From: Erin Strange [Erin.Strange@noaa.gov]
Sent: Wednesday, December 23, 2009 12:31 PM
To: Gasdick, Alicia E; Jeff McLain; Banonis, Michelle
Cc: Rhonda Reed; Leslie.Mirise; Joseph Dillon
Subject: NMFS Comments on 2009 Water Quality Data and 2009-2013 Interim Flow Release Program Water Quality Monitoring Plan
Attachments: NMFS Comments 2009 Water Quality Data & Monitoring Report.doc; Erin_Strange.vcf

Ali et.al.,

In the attachment NMFS provides some cursory comments regarding the results of this years water quality monitoring data results and the Draft 2009-2013 Interim Flow Release Program Water Quality Monitoring Plan. These comments are not intended to be all inclusive, but primarily to initiate conversation regarding the goals and direction of the water quality monitoring program. It's imperative that we collect the data necessary to inform our management decisions for fisheries.

Happy Holidays!!

Erin

<u>NMFS Comments on the 2009 Water Quality Data Results and the 2009-2013 Interim Flow Release Program Water Quality Monitoring Plan</u>

Erin Strange, NMFS Fishery Biologist
Joe Dillon, NMFS Water Quality Specialist

December 23, 2009

<u>2009 Water Quality Data</u>

- The reported limits are inappropriate in some cases.

Many of the water quality constituents, in particular the pesticides, have effects to aquatic life below the reported limits presented in the data summary table. Therefore, just because a constituent is below the reporting limit does not mean that everything is o.k. In addition, many of these constituents have additive effects with each other which means that small individual doses add up to effects.

For Example,
Chlorpyrifos – The reporting limit is 1.5 parts per billion as presented in these data results. But the water quality standard is much lower; 0.025 ppb to prevent affects to aquatic life and 0.015 ppb to prevent effects from chronic exposures. In addition, research demonstrates effects to salmonid olfaction abilities at about half this detection level (20% loss at 0.72 ppb, Sandahl *et al* 2004).

The Bureau should work with the SWRCB to determine the "achievable" limits so that the best data is collected.

- Toxicity testing is necessary to accurately evaluate effects to aquatic organisms, including salmonids.

Water column testing should be added at a few places in the system with a requirement that a toxicity identification evaluation (TIE) be conducted when there are "hits" for toxicity. The TIE teases out what categories of contaminants are contributing to the observed toxicity. This is particularly important for many of the new pyrethroid insecticides which are known to be toxic below detectable levels; a TIE is the only way to show that there is a problem.

The sediment toxicity testing should continue at more than 2 locations, until it's established that sediment toxicity is not a problem. For instance, many pyrethroids are bound to sediments rather than staying in the water column.

2009-2013 Interim Flow Release Program Water Quality Monitoring Plan

- Should include the standard suite of metals and other constituents. The Regional Board is the expert here on what they would typically require.

- Selenium is an important issue in the San Joaquin Basin. Research indicates that selenium may be much more toxic to juvenile salmonids than previously known. The current water quality standard of 5 ppb is not protective of salmonids.

- Should NMFS have a representative on the Water Quality Monitoring Workgroup?

- Although the SWAMP may be an appropriate program to frame this monitoring program, the reporting limits and level of testing in SWAMP may not be protective enough for the purposes of evaluating water quality effects to salmonids.

- Section 3.2; Each of the parameters described should have greater detail regarding the importance to aquatic life, fish, and salmonids specifically.

- Daily composite samples may not be appropriate to capture acute toxicity.

- Section 3.5; Because we are contemplating using the bypasses (Eastside, Chowchilla, Mariposa) to move fish in and out of the system, it seems that we should have some sampling in the bypasses also. This information would help inform our fish migration routing decision.

- Section 6; As part of the reporting, we need to include an analysis as to how water quality was or was not suitable for salmonids. This is the primary goal of the monitoring so it should be thoroughly evaluated to inform management decisions.

Banonis, Michelle

From: Jeanne Chilcott [jchilcott@waterboards.ca.gov]
Sent: Tuesday, January 26, 2010 1:06 PM
To: Kathy Mrowka
Cc: Banonis, Michelle; Eacock, Michael C. S.; Ken Landau; Rudy Schnagl; TJ Kopshy
Subject: SJRRP Monitoring Plan
Attachments: FW: SJRRP Monitoring Plan

Kathy, we received a copy of the SJRRP Monitoring Plan last week and still have a couple of concerns.

Attached is a copy of the response I'd received on an email commenting on the draft document that had been sent to the Bureau on December 17, 2009. I noticed that the email had not been included in the list of comments received on the draft, although most of our specific edits were incorporated. Our major concerns are still those express in the December 17th email:

—What process will be followed to incorporate modifications to the plan in response to new information (from data or from fisheries scientists)?
--Who comprises the various groups identified in the document (monitoring sub-group, DCRT, Data Management Organization, Technical advisory groups, etc) and how do they interact?

At this stage, we strongly recommend that a flowchart be added to the monitoring plan that addresses the issues above. The flowchart should clearly track the process from when an issue is raised (who does the question go to, what is that group's membership, where do the results of their review go) to who makes a final decision on a change and how is that change implemented (including funding).

We will be meeting with Chris Eacock tomorrow afternoon to discuss this topic as well as some other specific items (coordinating Grassland Bypass Monitoring with the SJRRP, resolving conflicts within the tables of the current document on where sampling will actually occur and which stations are active vs. proposed, data management for "responsible agencies", etc.).

I wanted you to be aware of our concerns since ultimate approval of the Monitoring Plan rests with State Board.

Jeanne Chilcott, Chief
San Joaquin Watershed Unit
Central Valley RWQCB
916/464-4788

New email: jchilcott@waterboards.ca.gov

Linda S. Adams
Secretary for Environmental Protection

State Water Resources Control Board

Division of Water Rights
1001 I Street, 14th Floor ♦ Sacramento, California 95814 ♦ 916.341.5300
P.O. Box 2000 ♦ Sacramento, California 95812-2000
FAX: 916.341.5400 ♦ www.waterboards.ca.gov/waterrights

Arnold Schwarzenegger
Governor

In Reply Refer
to:KDM:234

MAR 04 2010

RECEIVED

MAR 5 - 2010

Jason R. Phillips
U.S. Bureau of Reclamation
Mid-Pacific Region, MP-460
2800 Cottage Way
Sacramento, CA 95825-1898

Dear Mr. Phillips:

PERMITS 11885, 11886 AND 11887 (APPLICATIONS 234, 1465 AND 5638) OF U.S. BUREAU OF RECLAMATION, SAN JOAQUIN RIVER IN MADERA AND FRESNO COUNTIES

The Division of Water Rights (Division) has reviewed the January 8, 2010 "2009-2013 Interim Flow Release Program Water Quality Monitoring Plan" (Plan) called for in Condition 22 of Order WR 2009-0058-DWR. The Plan was submitted by the U.S. Bureau of Reclamation (Reclamation). As required, Reclamation forwarded the written comments on the Plan prepared by U.S. Fish and Wildlife Service (USFWS), Department of Fish and Game (DFG) and the Central Valley Regional Water Quality Control Board (Regional Board). The Division appreciates that the Regional Board staff provided a track changes edit version of the December 4, 2009 draft Plan to Reclamation, who forwarded it to the Division together with the final Plan. This facilitated our review.

As noted in the January 11, 2010 cover letter, the Plan should be viewed as a "living document" and modifications may be required as the agencies improve their understanding of the San Joaquin River system. Reclamation advised the Division that it will continue to hold weekly meetings with USFWS, DFG, Regional Board, California Department of Water Resources, National Marine Fisheries Service, and U.S. Environmental Protection Agency during the Water Year 2010 Interim Flow releases in order to ensure the most effective and efficient water and sediment quality data collection is undertaken and to adapt to real-time river conditions. The Plan is acceptable with the understanding that should the commenting agencies find that the water quality monitoring needs identified in Order WR 2009-0058-DWR are not being adequately met, they shall inform the Division promptly and Reclamation and the commenting agencies shall timely provide recommendations to the Division on any necessary modifications to the Plan for review, and possible incorporation into the Plan.

In its December 17, 2009 comments, Regional Board staff noted that the Plan is not as specific as it would normally require, but there is a need for adaptive management based on preliminary findings from the recent instream flow releases. In addition to the opportunity for revision to the Plan provided above, the Division will consider any additional changes to the Plan identified by the commenting agencies or others when we act on the long-term change petitions that Reclamation must submit to the Division to obtain long-term authorization for implementation of the Interim Flow Release Program.

Katherine Mrowka is the senior staff person presently assigned to this matter. If you require further assistance, Ms. Mrowka can be contacted at (916) 341-5363.

Sincerely,

Victoria A. Whitney

Victoria A. Whitney
Deputy Director for Water Rights

cc: Jeff McLain
U.S. Fish and Wildlife Service
2800 Cottage Way, Suite W2606
Sacramento, CA 95825

Karen Dulik
Department of Water Resources
3374 E. Shields Avenue
Fresno, CA 93726

Gerald Hatler
Department of Fish and Game
1234 East Shaw Avenue
Fresno, CA 93710

TJ Kopshy
Central Valley Regional Water
Quality Control Board
1685 E Street
Fresno, CA 93706

Ray Sohlberg
U.S. Bureau of Reclamation
2800 Cottage Way
Sacramento, CA 95825-1898

Jeanne Chilcott
Regional Water Quality Control Board,
Central Valley Region
11020 Sun Center Dr., Suite 200
Rancho Cordova, CA 95670

United States Department of the Interior

BUREAU OF RECLAMATION
Mid-Pacific Regional Office
2800 Cottage Way
Sacramento, California 95825-1898

IN REPLY REFER TO:

MP-170
PRJ-1.00

JAN 22 2010

Ms. Victoria Whitney
Deputy Director for Water Rights
Attn: Ms. Kathy Mrowka
State Water Resources Control Board
P.O. Box 2000
Sacramento, CA 95812-2000

Subject: Submittal of Sediment and Water Quality Monitoring Data Called for in Condition 22 of Order WR 2009-0058-DWR

Dear Ms. Whitney:

On October 1, 2009, the State Water Resources Control Board (State Board) issued Order WR 2009-0058-DWR (Order) for the Bureau of Reclamation, San Joaquin River Restoration Program (SJRRP) Water Year 2010 Interim Flows Project. Interim Flow releases began on October 1, 2009. On January 11, 2010, Reclamation submitted the 2009-2013 Interim Flow Release Program, Water Quality Monitoring Plan to the State Board.

Condition 22 of the Order states that Reclamation shall collect sediment and water quality information at specific locations along the river. These specific locations are included in tables within the Order, and are included as an enclosure to this document. The Order also states that results from all water quality monitoring must be submitted to the State Board, Division of Water Rights and the Central Valley Regional Water Quality Control Board (Regional Board) within two months of data collection.

Consistent with the Order, Reclamation conducted sediment and water quality sampling and monitoring for the fall 2009 Interim Flows. A scan of four types of pesticides in the water column was conducted. Based on results received from the laboratory to date, all four pesticides have been at non-detectable levels at the sample locations. Tests to date indicate that water quality results for trace elements, bacteria, total suspended solids, organic carbon, and other field measurements have been below levels of concern for human and aquatic life. As more monitoring data becomes available, Reclamation will continue to disseminate this information to the State Board and Regional Board. The monitoring data available to date is attached to this letter as an enclosure. The attached data has been quality controlled by Reclamation staff to ensure accuracy and consistency.

Reclamation has been, and will continue, to coordinate with the multi-agency SJRRP working group, called the Streamflow and Water Quality Monitoring (SFWQ) group, to fulfill the Order and to reach the SJRRP goals. The SFWQ group, which meets weekly during Interim Flow releases, includes the Regional Board, U.S. Fish and Wildlife Service, California Department of Fish and Game, California Department of Water Resources, U.S. Environmental Protection Agency, and National Marine Fisheries Service, to discuss Interim Flows data and adapt to real-time river conditions. The preliminary monitoring data is presented to this group through meetings and e-mail exchanges. The SFWQ group met from October 1 through November 19, 2009 to discuss river conditions. Following the completion of the fall flow releases on November 20, 2009, members of the SFWQ group continued to share information via e-mail as results became available. As flows are anticipated to be released from Friant Dam on February 1, 2010, the group will again commence the week of February 1 to further discuss sediment and water quality results and proposed future actions.

Thank you for your continued coordination and assistance in implementing the San Joaquin River Restoration Program's Water Year 2010 Interim Flows Project. Please contact me if you have any questions at 916-978-5455 or jphillips@usbr.gov.

Sincerely,

Alicia C Gasdick

FOR Jason R. Phillips
Program Manager

Enclosures - 2

Identical Letter Sent To:

Ms. Jeanne Chilcott, Chief
San Joaquin Watershed Unit
Central Valley Regional Water
Quality Control Board
11020 Sun Center Drive, Suite 200
Rancho Cordova, CA 95670

cc: Ms. TJ Kopshy
Central Valley Regional Water
Quality Control Board
11020 Sun Center Drive, Suite 200
Rancho Cordova, CA 95670
(w/ encl)

Attachment 13:

2010 Central Valley Project Water Supply Forecast Press Releases

OFFICE OF THE SECRETARY
U.S. Department of the Interior

www.doi.gov
News Release

Interior Hopeful on California Water Outlook

Forecast Expected to Improve – Additional Water Supplies to be Made Available

02/26/2010

Contact: Kendra Barkoff (202) 208-6416

WASHINGTON, D.C. — Secretary of the Interior Ken Salazar today announced the Bureau of Reclamation's Initial 2010 Central Valley Project (CVP) Water Supply Forecast and steps the United States government is taking to seek additional water supplies for drought-stricken farmers. Snowpack and runoff forecasts are significantly improved over the past three years and, if current weather patterns continue, California may have an "average" or better water year.

If 2010 is an average water year, allocations can be anticipated as follows:

- Senior agricultural water users along the Sacramento and San Joaquin rivers will be allocated 100 percent of their contract quantities (approximately 2.4 million acre feet);
- Friant Division agricultural water service contractors will be allocated 100 percent of Class 1 water;
- Eastside Division agricultural contractors (Stanislaus River) will be allocated 100 percent of their contract quantities (155,000 acre-feet);
- Agricultural water service contractors north of the Delta will be allocated 100 percent of their contract quantities;
- Agricultural water service contractors south of the Delta will be allocated 30 percent of their contract quantities;
- Municipal and industrial water service contractors north of the Delta will be allocated 100 percent, and those south of the Delta, 75 percent;
- Wildlife refuges north and south of the Delta will be allocated 100 percent of their "Level 2" water (approximately 400,000 acre feet).

These potential allocations are good news for the large majority of water users served by the Central Valley Project; however, the three previous years of drought and uncertainty regarding this water year present serious water supply challenges for west valley south of Delta agricultural water service contractors. In recognition of this fact, Secretary of the Interior Ken Salazar has directed the Department of the Interior to work with other federal and state agencies and other parties to secure additional water opportunities for farmers south of the Delta.

"Valley farmers have suffered tremendously during California's three year drought," said Salazar. "With the support and guidance of Senator Feinstein, Senator Boxer, Congressmen Costa and Cardoza, and a number of stakeholders, the Department has identified actions that will provide additional water on top of what an average water year would deliver."

Under the Interior initiative, it is expected that the additional water supplies secured through the collective efforts of federal and state agencies and many stakeholders are likely to be in the range of 150,000 to 200,000 acre feet, amounts that represent approximately 8 to 10 percent of the south of Delta agricultural water service contract quantities. These amounts represent new water supplies for 2010 that were not previously available to the west side.

They would add to other supplies available to west side farmers through their own efforts and planning.

To augment Interior's initiative, the Department of Agriculture has resources for farmers and communities available. "The US Department of Agriculture is committed to using its resources to help farmers in the Central Valley," said Secretary Vilsack. "Next week a team from USDA headquarters will go to California to work with local USDA staff from Rural Development, the Natural Resources Conservation Service and the Farm Service Agency to ensure that our farm and community programs are ready to be deployed and to ensure our conservation programs will provide more water in the Valley over the long term."

Assuming the necessary agreements and permits can be secured, the actions that are expected to provide additional supplies to the west side include: securing water from urban water suppliers in exchange arrangements; capturing and using excess restoration flows in the Mendota Pool; improved operations through more precise compliance with Old and Middle River flows by the Bureau of Reclamation and the State Water Project; additional water transfers to be made available from senior east side water users to the west side, over and above customary east to west side transfers; and authorization of additional pumping capacity at Banks Pumping Plant by the U.S. Corps of Engineers during times that are not restricted by water rights permit conditions or environmental requirements.

The measures that do not require additional agreements or permits will be implemented immediately. The Department will work with the state and other stakeholders on an on-going basis to confirm that progress is being made to secure these additional supplies.

"The Interior Department and my colleagues on the Federal Bay Delta Leadership Committee will work diligently and aggressively to provide these augmented water supplies, based on the recognition that this is a one-year, stop-gap measure to reduce the pain felt by farmers on the west side of the San Joaquin Valley," said Salazar. "Delivering these water supplies will require the cooperation of many parties, and we are pleased that other water users and stakeholders, with the active encouragement of Senator Feinstein, are stepping up to the plate to make it happen."

Although current weather patterns suggest that 2010 may be an average or better water year for California, the Bureau of Reclamation and the State of California also provide an official allocation at this time of year. That allocation is based on a "dry year" forecast which assumes, essentially, that there is little or no additional precipitation over the balance of the water year. For more detailed information about the initial 2010 Central Valley Project water supply forecast, please go to http://www.usbr.gov/mp/pa/water Under this scenario, some junior agricultural interests north and south of the Delta would receive an allocation of 5 percent of their water service contracts.

The Secretary further noted that "[t]he reality is that the Bay Delta ecosystem has collapsed, and a major, long-term solution is needed to secure reliable water flows. We are looking forward to input from the National Academy of Sciences on these questions and will continue to aggressively pursue a comprehensive water supply and restoration plan, working closely with Governor Schwarzenegger and his team, Senators Feinstein and Boxer, Congressman George Miller and other members of the delegation, and all stakeholders, so that California can have a sustainable water future."

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News Release

Interior Announces Increased Water Supply Allocations in California

Additional Water Supplies to be Made Available South of Delta

03/16/2010

Contact: Kendra Barkoff/Joan Moody
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WASHINGTON, D.C. – Secretary of the Interior Ken Salazar today announced that the Bureau of Reclamation's 2010 Central Valley Project Water Supply allocations have increased throughout the valley as a result of additional precipitation, improved snowpack, and improved storage at Shasta Reservoir. As forecast by Reclamation on February 26, California is having a near-average water year following three years of drought.

"The Department is deeply committed to working with all stakeholders to find solutions to the challenges – both short term and long term – facing water users throughout the Central Valley," said Secretary Salazar, who was joined on the teleconference by Deputy Secretary David J. Hayes and Bureau of Reclamation Commissioner Mike Connor. "In this case, we accelerated our reporting of updated allocations, hoping to get the best available information to agricultural water service contractors as quickly as possible. This allocation update shows improvements from the previous allocation – just as we hoped in our recent announcement."

Typically, Reclamation would release the March allocation update around March 22nd, but moved up the announcement at the urging of Senators Feinstein and Boxer, and Congressmen Costa and Cardoza.

Compared to the previous allocation, and using a conservative forecast regarding additional precipitation (generally referred to as the 90 percent exceedence forecast):

- The allocation for settlement contractors with claims to senior water rights along the Sacramento and San Joaquin Rivers remains at 100 percent of their contract quantities (approximately 2.4 million acre-feet).
- Friant Division agricultural water service contractors' allocation remains at 100 percent of Class 1 water and increases the Class 2 allocation to 10 percent – up from 0 percent.
- Eastside Division agricultural contractors' (Stanislaus River) allocation remains at 100 percent of their contract quantities (155,000 acre-feet).
- Agricultural water service contractors north of the Delta are allocated 50 percent of their contract quantities – up from 5 percent.
- Agricultural water service contractors south of the Delta are allocated 25 percent of their contract quantities – up from 5 percent.
- Municipal and industrial water service contractors north of the Delta are allocated 75 percent – up from 55 percent – and those south of the Delta, 75 percent – also up from 55 percent.
- Wildlife refuges' allocation north and south of the Delta remains at 100 percent of their "Level 2" water (approximately 400,000 acre-feet).

“This is good news for the large majority of water users served by the Central Valley Project, but we realize that South-of-Delta agricultural water service contractors face serious water supply challenges, in part as a result of three consecutive years of drought and operational constraints imposed on the CVP to address water quality and fish species of concern. That’s why we continue to work hard and make progress towards providing an additional 8 to 10 percent for agriculture south of the Delta,” said Secretary Salazar.

The Department of the Interior is working diligently and in close partnership with other Federal and State agencies, South-of-Delta contractors, and other stakeholders to secure additional water for agricultural water users on the west side of the San Joaquin Valley. Under this initiative, it is expected that a range of an additional 150,000 to 200,000 acre-feet will be secured, or 8-10 percent of west side South-of-Delta agricultural water service contract quantities. These amounts represent new supplies for 2010 not previously available to the west side of the San Joaquin Valley.

“While we must take immediate steps and stop-gap measures, we cannot lose sight of our long-term plans to help California’s situation,” added Salazar. “We will continue to aggressively pursue a comprehensive water supply and restoration plan, working closely with Governor Schwarzenegger and his team, Senators Feinstein and Boxer, Congressmen Miller, Costa, Cardoza, Thompson, Napolitano, and other members of the delegation, and all stakeholders, so that California can have a sustainable water future.”

Additional information regarding the updated forecast, including water supply forecasts based on both the median (50 percent exceedence) and conservative (90 percent exceedence) levels, is available in the Bureau of Reclamations March 16, 2010 Information Release and at www.usbr.gov/mp/pa/water.

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News Release

Interior Announces Increased Water Supply Allocations in California

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Central Valley Water Supply Continues to Improve

04/15/2010

Contact: Joan Moody (202) 208-6416

WASHINGTON, D.C. —Secretary of the Interior Ken Salazar today announced that the Bureau of Reclamation's 2010 Central Valley Project Water Supply allocations have increased throughout the valley as a result of improved hydrologic conditions as they existed as of April 1, 2010 and as reflected in the California Department of Water Resources (DWR) April 2010 snow survey and runoff forecast.

"For the second consecutive month, we are accelerating our reporting of updated allocations, in an effort to get the best available information to our contractors as quickly as possible to aid in their planning decisions for the upcoming season," stated Secretary of the Interior Ken Salazar.

Compared to the previous allocation and using a conservative forecast (generally referred to as the 90-percent exceedance forecast):

- The allocation for Municipal and Industrial (M&I) water service contractors north of the Delta, including American River and Contra Costa M&I contractors, is 100 percent—up from 75 percent
- M&I water service contractors south of the Delta remain at 75 percent allocation.
- Agricultural water service contractors north of the Delta are allocated 100 percent—up from 50 percent.

- Agricultural water service contractors south of the Delta are allocated 30 percent—up from 25 percent.
- Friant Division agricultural water service contractors' allocation of Class 2 water supply increases to 15 percent—up from 10 percent; Class 1 allocation remains at 100 percent.
- Eastside Division agricultural contractors' (Stanislaus River) allocation remains at 100 percent of their contract quantities (155,000 acre-feet).
- The allocation for settlement contractors with claims to senior water rights along the Sacramento and San Joaquin Rivers remains at 100 percent of their contract quantities (approximately 2.4 million acre-feet).
- Wildlife refuges' allocation north and south of the Delta remains at 100 percent of their "Level 2" water (approximately 400,000 acre-feet).

"Serious water supply challenges still exist for South-of-Delta agricultural contractors in part as a result of 3 consecutive years of drought, early water year 2010 dry conditions, as well as operational constraints on the CVP to address water quality and fish species of concern," said Secretary Salazar. "As I announced in March of this year, we are committed to efforts to secure an additional 8 to 10 percent supply for agricultural contractors south of the Delta. We are expecting that up to 150,000 to 200,000 acre-feet can be secured to help supplement the South-of-Delta supplies." These amounts represent new supplies for 2010 not previously available to the west side of the San Joaquin Valley.

"It is through our strong partnerships that we can best address the Central Valley Project's water supply challenges – both short term and long term. We, along with agencies and stakeholders, are fully engaged in developing water supply solutions while at the same time honoring conservation requirements and contract responsibilities." added Secretary Salazar. "Working closely with Governor Schwarzenegger, Senators Feinstein and Boxer, Congressmen Miller, Costa, Cardoza, Thompson, and Grace Napolitano and other members of the Congressional delegation, plus all stakeholders, the Department is fully engaged in establishing solutions for a sustainable water supply in California."

Water supply updates will be made monthly or more often as necessary based on new information throughout the precipitation season. Additional information, including the allocation table, and water supply updates are posted on the Mid-Pacific Region's website at http://www.usbr.gov/mp/PA/water/.

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News Release

Secretary Salazar Announces Increased Central Valley Project 2010 Water Allocation

Agricultural Water Service Contractors South-of-Delta Receive 40 Percent Allocation

05/04/2010

Pete Lucero (Reclamation) 916-978-5100
Hugh Vickery (DOI) 202-208-6416

WASHINGTON -- Secretary of the Interior Ken Salazar today announced that the Bureau of Reclamation's 2010 Central Valley Project (CVP) Water Supply allocations have increased for agricultural water service contractors in California's San Joaquin Valley.

"I am pleased to announce that the water allocation for the hard hit, South-of-Delta agricultural water service contractors has increased to 40 percent, up from the initial 5 percent allocation in February," said Salazar. "It is because of the determination and cooperation of our partner agencies, water users, and stakeholders, and because of the support of Senators Feinstein and Boxer, and Congressional Representatives Miller, Cardoza, Costa, Thompson, and Grace Napolitano that we are able to make this announcement today."

The improved allocation is based in large part on the efforts announced by Secretary Salazar in February to secure additional sources of water to boost allocations for South-of-Delta agricultural water service contractors on the west side of the San Joaquin Valley and improved storage and runoff into the CVP reservoirs, in particular the American River watershed. The California Department of Water Resources has been a key partner in the effort to shore up supplies. Since the February announcement, Reclamation has continued to firm up supplemental water supplies through the following actions:

- Improved operations through more precise compliance with Old and Middle River flows by the Bureau of Reclamation and the State Water Project;
- Additional water transfers to be made available from senior east side water users to the west side, through groundwater substitution and other actions;
- Adjusting the timing of water use (sometimes referred to as source shifting) to address low point issues in San Luis Reservoir;
- Capturing and temporarily using excess San Joaquin River Restoration Program flows in the Mendota Pool;
- Applying Joint Point Diversion operations to allow for more flexibility between the state and Federal projects.

"While this improvement is welcome news, California's Central Valley is still struggling to overcome the effects of three years of drought and water system operational constraints needed to address water quality and fish species of concern in the Delta," added Secretary Salazar. "The department continues to work with the state and other water interests to improve the reliability of water delivery throughout California."

Compared to the previous allocation and using a conservative forecast (generally referred to as the 90-percent exceedance forecast):

- The allocation for Municipal and Industrial (M&I) water service contractors north of the Delta, including American River and Contra Costa M&I contractors, remains at 100 percent.
- M&I water service contractors south of the Delta remains at 75 percent allocation.
- Agricultural water service contractors north of the Delta remains at 100 percent allocation.
- Agricultural water service contractors south of the Delta are allocated 40 percent—up from the 30 percent allocation made on April 15, 2010.
- Friant Division agricultural water service contractors' allocation of Class 2 water supply increases to 30 percent—up from 15 percent; Class 1 allocation remains at 100 percent.
- Eastside Division agricultural contractors' (Stanislaus River) allocation remains at 100 percent of their contract quantities.
- The allocation for settlement contractors with claims to senior water rights along the Sacramento and San Joaquin Rivers remains at 100 percent of their contract quantities.
- Wildlife refuges' allocation north and south of the Delta remains at 100 percent of their "Level 2" water.

For additional information on today's announcement, please see the Mid-Pacific Region's website at http://www.usbr.gov/mp/pa/water. For questions or additional information, please contact the Region's Public Affairs Office at 916-978-5100 (TTY 916-978-5608) or e-mail mppublicaffairs@usbr.gov.

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News Release

June 14, 2010
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Secretary Salazar Announces Increased Central Valley Project 2010 Water Allocation

Agricultural Water Service Contractors South-of-Delta Receive 45 Percent Allocation

WASHINGTON, DC -- Secretary of the Interior Ken Salazar today announced that the Bureau of Reclamation's 2010 Central Valley Project Water Supply allocation has increased for agricultural water service contractors in California's San Joaquin Valley.

"I am pleased to announce that the water allocation for the hard-hit agricultural water service contractors south of the Delta has increased to 45 percent—up from the 40 percent allocation in May," said Secretary Salazar. "This latest increase in allocation is a result of favorable weather conditions this spring and better-than-expected pumping conditions in the south Delta."

Compared to the previous allocation:

- The allocation for Municipal and Industrial water service contractors north of the Delta, including American River and Contra Costa contractors, remains at 100 percent.
- Municipal and Industrial water service contractors' allocation south of the Delta remains at 75 percent.
- Agricultural water service contractors' allocation north of the Delta remains at 100 percent.
- Agricultural water service contractors south of the Delta are allocated 45 percent—up from the 40 percent allocation made on May 4, 2010.
- Friant Division agricultural water service contractors' allocation of Class 1 water supply remains at 100 percent and the Class 2 water supply remains at 30 percent.
- Eastside Division agricultural contractors' (Stanislaus River) allocation remains at 100 percent of their contract quantities.
- The allocation for settlement contractors with claims to senior water rights along the Sacramento and San Joaquin Rivers remains at 100 percent of their contract quantities.

- Wildlife refuges' allocation north and south of the Delta remains at 100 percent of their "Level 2" water.

"Conditions have improved somewhat but California's Central Valley is still struggling with the effects of three years of drought and water system operational constraints needed to address water quality and fish species of concern in the Delta," Secretary Salazar said. "The Department, working closely with the state, other water interests, and California's congressional delegation**,** is striving to identify and implement short, mid, and long-term improvements to the reliability of water deliveries throughout California while also improving environmental conditions in the Delta."

Salazar credited the determination and support of Senators Feinstein and Boxer, and Congressional Representatives Miller, Cardoza, Costa, Thompson, and Grace Napolitano, as well as the cooperation of partner agencies, water users and stakeholders for making possible today's announcement.

For additional information on today's announcement, please see the Mid-Pacific Region's website at http://www.usbr.gov/mp/pa/water. For questions or additional information, please contact the Region's Public Affairs Office at 916-978-5100 (TTY 916-978-5608) or e-mail mppublicaffairs@usbr.gov.

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