

Chapter 1

Introduction

The Upper San Joaquin River Basin Storage Investigation (Investigation) is a joint feasibility study by the U.S. Department of the Interior, Bureau of Reclamation (Reclamation), in cooperation with the California Department of Water Resources (DWR). The purpose of the Investigation is to determine the potential type and extent of Federal, State of California (State), and regional interest in a potential project to expand water storage capacity in the upper San Joaquin River watershed for improving water supply reliability and flexibility of the water management system for agricultural, urban, and environmental uses; and enhancing San Joaquin River water temperature and flow conditions to support anadromous fish restoration efforts.

The Investigation is one of five surface water storage studies recommended in the CALFED Bay-Delta Program (CALFED) Programmatic Environmental Impact Statement/Report (PEIS/R) Record of Decision (ROD) of August 2000. Preliminary studies in support of the CALFED PEIS/R considered more than 50 surface water storage sites throughout California and recommended more detailed study of five sites identified in the ROD (CALFED 2000a, 2000b, 2000c).

Progress and results of the Investigation have been documented in a series of interim reports that will culminate in a Feasibility Report and Environmental Impact Statement (EIS)/ Environmental Impact Report (EIR), consistent with the *Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies* (P&G) (WRC 1983); Reclamation policies and directives and standards; DWR guidance; and applicable environmental laws and policies. The Feasibility Report and EIS/EIR address and build on the results of the feasibility study process and findings of previous planning documents, including the *Phase I Investigation Report* (Reclamation 2003), *Initial Alternatives Information Report* (Reclamation 2005b) and *Plan Formulation Report* (Reclamation 2008a). After a detailed plan formulation and site selection process, Temperance Flat River Mile (RM) 274 Reservoir was identified as the site to be carried forward for more detailed analysis in the feasibility phases of the Investigation (Reclamation 2008a).



Aerial View of Millerton Lake and Upper San Joaquin River Basin

Draft Feasibility Report Purpose and Organization

The primary purpose of this Draft Feasibility Report is to (1) present the results to date of the ongoing Investigation; (2) determine the potential type and extent of Federal and non-Federal interest in alternative plans to improve water supply reliability and flexibility of the water management system for agricultural, urban, and environmental uses; enhance San Joaquin River water temperature and flow conditions to support anadromous fish restoration efforts; and address related water resources needs and opportunities; (3) evaluate potential benefits and effects of alternative plans; and (4) determine technical, environmental, economic, and financial feasibility of alternative plans. Consideration of comments received on the Draft Feasibility Report and pending Draft EIS/EIR will be reflected in the Final Feasibility Report.

This Draft Feasibility Report includes the following topics:

- **Chapter 1** describes the study authorization; project background; and a summary of problems, needs and opportunities, and Investigation planning objectives. The chapter also describes the Investigation study area; and prior studies, projects, and programs pertinent to the Investigation.
- **Chapter 2** describes the identified problems, needs, and opportunities; and existing and likely future water resources and related conditions in the study area.
- **Chapter 3** describes the plan formulation process, including planning objectives and opportunities; planning constraints, principles, and criteria used to help guide the Investigation; and management measures, storage site selection, and refinement of features and operations for alternative plans.
- **Chapter 4** presents the No-Action Alternative and alternative plans, including features, operations, and physical accomplishments.
- **Chapter 5** provides the evaluation and comparison of alternative plans by P&G criteria and presents the rationale for selection of a recommended plan.

- **Chapter 6** describes the representative plan, including its features and accomplishments, allocation and assignment of costs, Federal and non-Federal responsibilities, and potential implementation schedule.
- **Chapter 7** provides an overview of coordination and public involvement for the Investigation, including stakeholder outreach, public involvement plan, and agency coordination and consultation.
- **Chapter 8** summarizes major findings of this Draft Feasibility Report
- **Chapter 9** contains the sources used to prepare this Draft Feasibility Report.

Study Authorization and Guidance

Federal and State authorizations for the Investigation and related guidance are described below.

Federal Authorization

Reclamation is the Federal lead agency for the Investigation. Federal authorization for the Investigation was initially provided in Public Law 108-7, Division D, Title II, Section 215, the omnibus appropriations legislation for Fiscal Year 2003, enacted in February 2003. This act authorized the Secretary of the Interior to conduct feasibility studies for several storage projects identified in the CALFED ROD (2000a), including the Investigation:

The Secretary of the Interior, in carrying out CALFED-related activities, may undertake feasibility studies for Sites Reservoir, Los Vaqueros Reservoir Enlargement, and Upper San Joaquin Storage projects. These storage studies should be pursued along with ongoing environmental and other projects in a balanced manner.

Subsequent authorization and funding for the Investigation was provided in Public Law 108-361, Title I, Section 103, Subsection (d)(1)(A)(ii), the Water Supply, Reliability, and Environmental Improvement Act, signed October 25, 2004:

Planning and feasibility studies for the following projects requiring further consideration –... (II) the Upper San Joaquin River storage in Fresno and Madera Counties.

At the conclusion of the Investigation, the Secretary may submit the Feasibility Report to Congress with a recommendation to construct with Federal funding, according to Public Law 108-361, Title I, Section 103, Subsection (d)(1)(B)(i):

If on completion of the feasibility study for a project described in clause (i) or (ii) of subparagraph (A), the Secretary, in consultation with the Governor, determines that the project should be constructed in whole or in part with Federal funds, the Secretary shall submit the feasibility study to Congress.

State of California Authorization

DWR is the State lead agency for the Investigation. Section 227 of the California Water Code (CWC) authorizes DWR to participate in water resources investigations:

The department may investigate any natural situation available for reservoirs or reservoir systems for gathering and distributing flood or other water not under beneficial use in any stream, stream system, lake, or other body of water. The department may ascertain the feasibility of projects for such reservoirs or reservoir systems, the supply of water that may thereby be made available, and the extent and character of the areas that may be thereby irrigated. The department may estimate the cost of such projects.

Guidance in the CALFED Record of Decision

The principal objective of CALFED was to develop a comprehensive, long-term strategy to provide reliable water supplies to cities, agriculture, and the environment while restoring the overall health of the San Francisco Bay/Sacramento-San Joaquin Delta (Bay-Delta). The National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA) lead agencies for the CALFED PEIS/R were Reclamation and DWR, respectively.

Several program elements were defined that, in combination, would help attain the overall goals of CALFED. The CALFED ROD recommended numerous projects and actions to increase water supply reliability, improve ecosystem health, increase water quality, and improve Sacramento-San Joaquin Delta (Delta) levee stability (CALFED 2000a). The Storage Program element included five investigations of potential increased surface storage capabilities at various locations in the Central Valley, including the upper San Joaquin River Basin, as well as efforts to increase groundwater storage through conjunctive management. For the upper San Joaquin River Basin, the CALFED ROD states the following:

... 250-700 [thousand acre-feet (TAF)] of additional storage in the upper San Joaquin watershed... would be designed to contribute to restoration of and improve water quality for the San Joaquin River and facilitate conjunctive water management and water exchanges that improve the quality of water deliveries to urban communities. Additional storage could come from enlargement of Millerton Lake at Friant Dam or a functionally equivalent storage program in the region.

Summary of Problems, Needs, Opportunities, and Planning Objectives

Several water and related resources problems, needs, and opportunities were identified for the Investigation based on the study authorization, information from prior studies, projects, programs, existing and likely future water resources conditions, and input to the study process through public outreach.

Planning objectives were then developed on the basis of identified problems, needs, and opportunities, study authorities, and other pertinent direction, including information contained in the 2000 CALFED ROD.

Problems, Needs, and Opportunities

Water and related resources problems, needs, and opportunities include water supply reliability and operational flexibility, San Joaquin River ecosystem, and other resources, as summarized below and discussed in detail in Chapter 2.

Without further investment in water management and infrastructure, future statewide shortages are expected to increase to approximately 4.9 million acre-feet per year by 2030 (DWR 2009a).

Water Supply Reliability and Operational Flexibility

California's water supply system faces critical challenges with demands exceeding supplies for urban, agricultural, and environmental (fisheries, wildlife refuges) water uses across the State. Without further investment in water management and infrastructure, future statewide shortages are expected to increase to approximately 4.9 million acre-feet (MAF) per year by 2030. Challenges will be greater during drought years, when environmental and agricultural water becomes less available, and a greater reliance on limited groundwater results in overdraft (DWR 2009a).

Urban and required environmental water uses have each increased, resulting in increased competition and conflicting demands for limited water supplies. Increasing Central Valley Project (CVP) and State Water Project (SWP) operational constraints have also led to growing competition for limited system resources. Another potentially significant factor affecting water supply reliability is climate change, which could broadly impact precipitation and runoff, snowpack, flood risk management, water demand, and sea levels. In addition to concerns about future water supply and demand, the CVP and SWP lack flexibility in timing, location, and storage capacity to meet multiple purposes. The water and flood systems face the threat of too little water to meet needs during droughts and too much water during floods, respectively. In the Friant Division of the CVP, the 520 thousand acre-foot (TAF) storage capacity of Millerton Lake, located on the upper San Joaquin River, is small compared to the average annual inflow to the lake of approximately 1.8 MAF and limits the Reclamation's ability to capture additional water in wet years. Passage of the San Joaquin River Restoration Settlement Act in 2009 required Reclamation to release additional flows from Friant Dam to the San Joaquin River, adding operational requirements for which the dam was not originally designed, and reducing water supply allocations to the Friant Division.

Improved water management flexibility and adaptability capabilities are needed to meet current and future challenges associated with increasing population, environmental needs, and climate change. An integrated portfolio of solutions, regional and statewide, to meet future water supply needs would include increased urban water use efficiency, recycling of municipal supplies, and improving Delta conveyance. In addition, development of additional water sources will be critically important in any future water resources plan.

San Joaquin River Ecosystem

After construction of Friant Dam and before implementation of the San Joaquin River Restoration Program (SJRRP), the San Joaquin River between Friant Dam and the Merced River confluence did not support a continuous riparian and aquatic ecosystem. Generally unhealthy ecosystem conditions for the native cold water fishery resulted from lack of reliable flows and poor water temperatures in the San Joaquin River.

Implementing the SJRRP is expected and intended to alter the ecosystem conditions of the San Joaquin River, with a 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. Actions to achieve the Restoration Goal include the release and conveyance of Restoration Flows from Friant Dam to the confluence of the Merced River, several channel capacity and fish passage improvements, and introduction of Chinook salmon.

In addition to flow, success of Chinook salmon populations is known to be affected by water temperature. Water temperatures that are too high, or in some cases too low, could be detrimental to the various life stages of salmon.

Other Resources

Several other problems, needs, and opportunities associated with the San Joaquin River have been identified. Major storms during the past 3 decades have demonstrated that Friant Dam has little capacity to store water from large runoff events, resulting in flood releases downstream in almost 50 percent of the years. Demands for hydropower and ancillary services are expected to increase in the future. Demands are also increasing for water-oriented recreation in the Central Valley. River water quality is degraded due to low flow and poor quality discharges. Urban drinking water treatment costs are rising.

Planning Objectives

A set of primary and secondary planning objectives were developed for the Investigation to address identified problems, needs, and opportunities described above. Primary planning objectives are those for which specific alternatives are formulated to address. Secondary planning objectives are actions, operations, or features that should be considered in the plan formulation process, but only to the extent possible through pursuit of the primary planning objectives.

- Primary planning objectives are:
 - Increase water supply reliability and system operational flexibility for agricultural, municipal and industrial (M&I), and environmental purposes in the Friant Division, other San Joaquin Valley areas, and other regions.
 - Enhance water temperature and flow conditions in the San Joaquin River from Friant Dam to the Merced River in support of restoring and maintaining naturally reproducing and self-sustaining anadromous fish (i.e., spring-run and fall-run Chinook salmon [*Oncorhynchus tshawytscha*]) and other fish populations.
- Secondary planning objectives are:
 - Reduce frequency and magnitude of flood releases from Friant Dam.
 - Maintain the value of hydropower attributes.
 - Maintain and increase recreational opportunities in the primary study area.
 - Improve San Joaquin River water quality downstream from Friant Dam.
 - Improve quality of water supplies delivered to urban areas.

Additional details regarding the objectives are provided in Chapter 3.

Study Area

The San Joaquin River is California's second longest river and discharges to the Delta and, ultimately, to the Pacific Ocean through San Francisco Bay. Originating high in the Sierra Nevada, the San Joaquin River carries snowmelt and rainfall runoff from mountain meadows south of Yosemite National Park to the valley floor near Fresno. Tributaries to the San Joaquin River from the east include the Merced, Tuolumne and the Stanislaus rivers; small streams, sloughs, wetlands, and agricultural drainage provide inflow from the west.

The upper San Joaquin River Basin encompasses the San Joaquin River and tributary lands from its source high in the Sierra Nevada to its confluence with the Merced River. Friant Dam and Millerton Lake are located on the upper San Joaquin River about 20 miles northeast of Fresno. The Investigation includes both a primary and extended study area to reflect the localized effects of a potential new major dam and reservoir at Temperance Flat RM 274, and the effects of subsequent water deliveries over a rather large geographic area. The primary study area was refined as the Investigation has progressed and the number and location of storage sites have been narrowed. The primary study area presented in this Draft Feasibility Report includes the following (Figure 1-1):

- San Joaquin River upstream from Friant Dam to Kerckhoff Dam, including Millerton Lake and the area that would be inundated by the proposed Temperance Flat RM 274 Reservoir.
- Areas that could be directly affected by construction-related activities, including the footprint of proposed temporary and permanent facilities upstream from Friant Dam.

The extended study area includes locations of potential project features and areas potentially affected by alternative implementation and/or operation. The extended study area encompasses the following (Figure 1-2):

- San Joaquin River downstream from Friant Dam, including the Delta
- Lands served by San Joaquin River water rights
- Friant Division of the CVP, including underlying groundwater basins in the eastern San Joaquin Valley
- South-of-Delta (SOD) water service areas of the CVP and SWP

Detailed descriptions of the study area and existing conditions for physical, biological, cultural, and socioeconomic resources within the Investigation study area will be included in the Draft EIS/EIR.

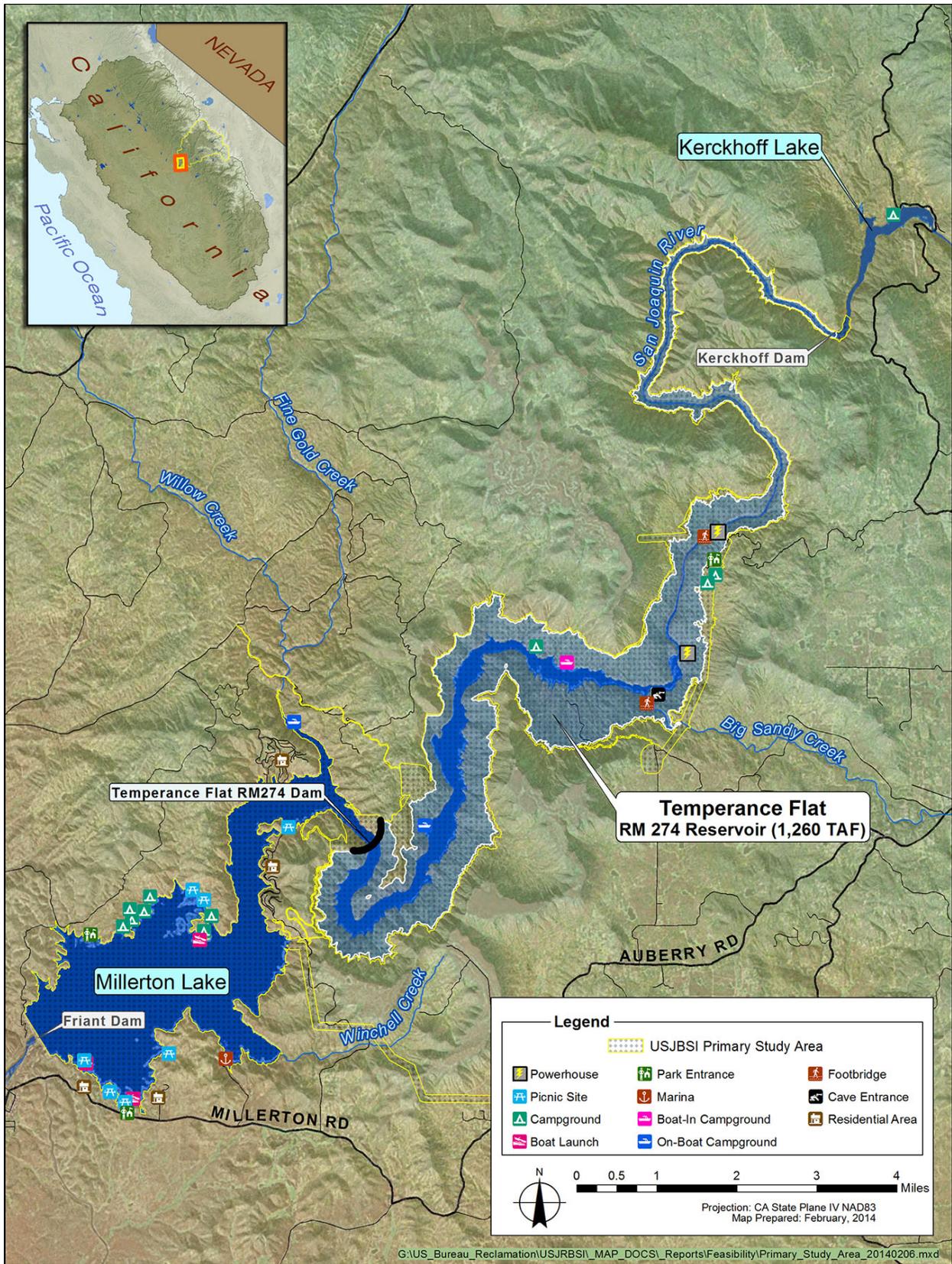


Figure 1-1. Primary Study Area and Temperance Flat RM 274 Reservoir

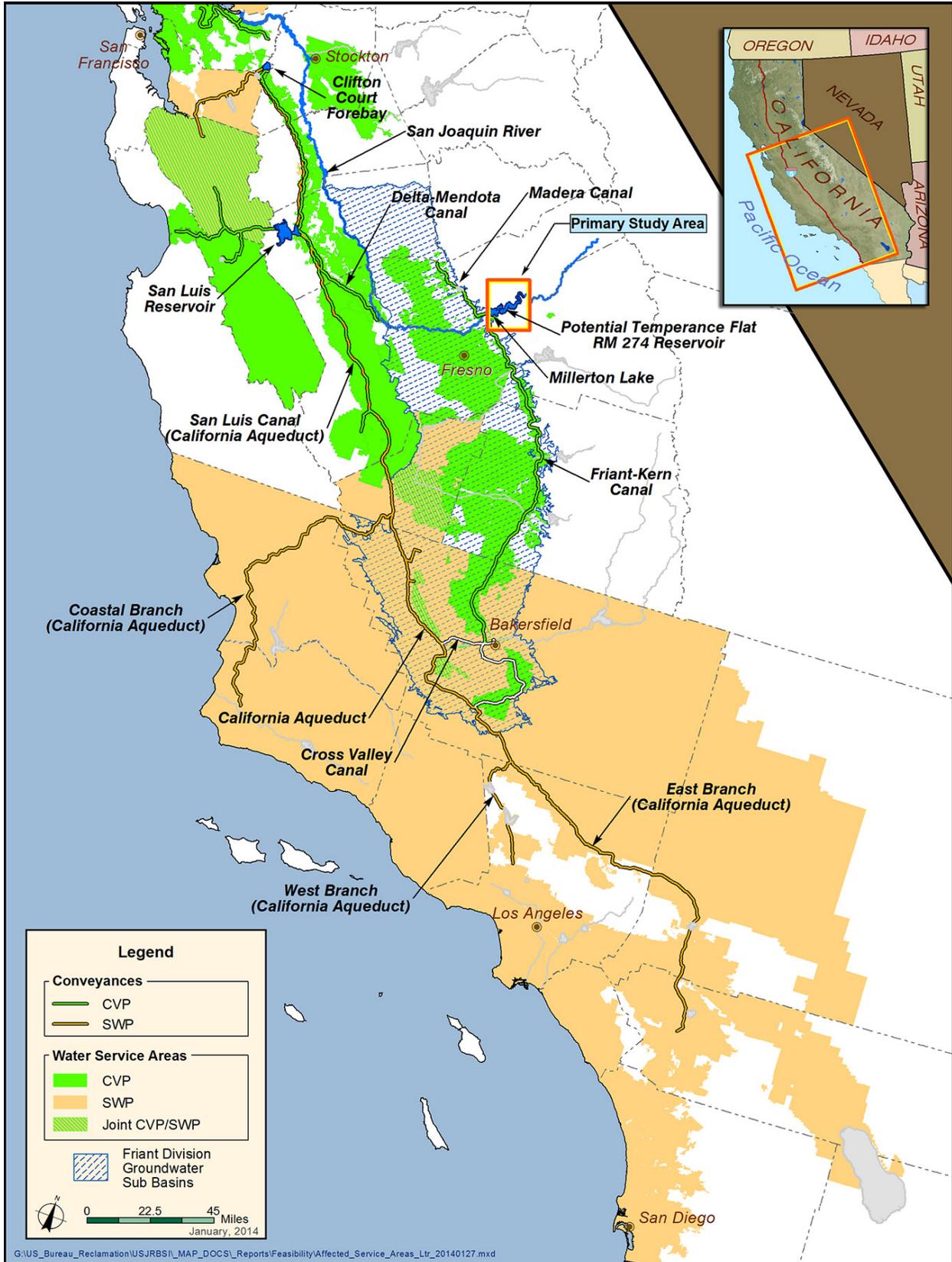


Figure 1-2. Extended Study Area

Related Studies, Projects, Programs, and Plans

Various Federal and State agencies, including Reclamation, U.S. Army Corps of Engineers (USACE), and DWR, and numerous local working groups and private organizations are conducting activities pertinent to the Investigation. A summary of these pertinent studies, projects, programs, and plans in the study area follows.

Federal

Federal studies, projects, programs, and plans relevant to the Investigation are described below.

U.S. Department of the Interior, Bureau of Reclamation

As the owner and operator of the CVP, including Friant Dam and Millerton Lake, Reclamation has many ongoing projects or continuing programs and plans relevant to the Investigation.

Central Valley Project

The CVP, the largest surface water storage and delivery system in California (see Figure 1-2), supplies water to more than 250 long-term water contractors in the Central Valley, Tulare Lake Basin, and San Francisco Bay Area (Bay Area) (Reclamation 2013a). CVP service areas, shown in Figure 1-2, cover 29 of the State's 58 counties. Operated by Reclamation, the CVP consists of 20 reservoirs capable of storing over 11 MAF of water, 11 power plants; 500 miles of major canals and aqueducts; and many tunnels, conduits, and power transmission lines (Reclamation 2013a). Annually, the CVP has the potential to supply about 7.0 MAF for agricultural, urban and industrial, and wildlife uses (Reclamation 2013a). The CVP also provides flood protection, navigation, power, recreation, and water quality benefits.

Prior Studies of Enlarging Friant Dam

Several previous studies examined the potential to provide new water storage at Millerton Lake. In 1952, 10 years after completion of Friant Dam, Reclamation conducted a study to determine the feasibility of raising Friant Dam (Reclamation 1952). The study included designs and costs for raising Friant Dam by 60 feet and constructing four earth saddle dams. Based on a comparison of costs to potential revenue from the sale of increased yield, the study concluded that the raise would be infeasible.

Reclamation revisited the potential cost for a 60-foot raise at a reconnaissance level in 1975, and developed a cost estimate for an approximate 140-foot raise in 1982 (Reclamation 1982). In 1997, Reclamation again reconsidered the feasibility of raising Friant Dam to provide additional storage capacity in Millerton Lake. Raises of 60 feet and 140 feet were considered (Reclamation 1997). Also, in 2000, a study conducted for the Friant Water Users Authority (FWUA) and Natural Resources Defense Council (NRDC) coalition considered a 20-foot raise of Friant Dam as one of many alternatives for increasing potential water supply to the San Joaquin River (FWUA and NRDC 2002).

Central Valley Project Improvement Act

Enacted in 1992, the Central Valley Project Improvement Act (CVPIA) addresses conflicts over water rates, irrigation land limitations, and environmental impacts of the CVP. A major purpose of the CVPIA is to provide equal priority and consideration to protection, restoration, and enhancement of fish, wildlife, and associated habitats of the Delta estuary and tributaries when evaluating the purpose of the CVP. The CVPIA also addresses the operational flexibility of the CVP and methods to expand the use of voluntary water transfers and improved water conservation. The CVPIA dedicated approximately 1.2 MAF of water annually to fish, wildlife, and habitat restoration. Of this water, 800 TAF is dedicated to environmental needs as Section 3406(b)2 water, approximately 200 TAF was designated for wildlife refuges, and approximately 200 TAF was dedicated for increased Trinity River flows for fisheries restoration. Through operations flexibility, this results in a net reduction of 516 TAF per year on average, and 585 TAF in the driest years, previously available to CVP contractors (Reclamation 2008b).

CVP Yield Feasibility Investigation: Delivery Impact of CVPIA

In May 2005, Reclamation quantified the delivery impacts of the CVPIA on the CVP and analyzed a wide range of storage and conveyance projects to offset these impacts in *A CVP Yield Feasibility Investigation Report: The Delivery Impact of CVPIA* (Delivery Impact Report) (Reclamation 2005a). Total delivery impacts of the CVPIA to agricultural and M&I contractors were determined to be 516 TAF in average water years and 586 TAF in dry years, with impacts to SOD contractors being much greater than impacts to north-of-Delta (NOD) contractors, and impacts to agricultural contractors being much greater than impacts to M&I contractors. In the

Delivery Impact Report, Reclamation analyzed 90 difference combinations of increased conveyance, increased NOD storage, and increased SOD storage. Reclamation recommended continued participation in CALFED programs, participation in regional and watershed integrated resource management planning activities, and continued CVP and SWP integrated operations to help offset delivery impact of the CVPIA.

Water Supply and Yield Study

In March 2008, Reclamation prepared the *Water Supply & Yield Study*, which describes existing California statewide water demand and available supplies, as well as projected future demand, available supplies, and willingness to pay for CALFED storage and conveyance projects (Reclamation 2008b). Using demands from DWR's *California Water Plan Update 2005* and assuming no inter-basin transfers, statewide supply-demand gaps were calculated to be 2.3 MAF in average water years and 4.2 MAF in dry water years. Without investment in storage and conveyance projects, statewide supply-demand gaps were projected to grow to 4.9 MAF in average water years and 6.1 MAF in dry water years by 2030. The *Water Supply & Yield Study* also determined that if CALFED storage and conveyance projects, including the Investigation, were constructed, the projected 2030 supply-demand gap would be reduced to 1.5 MAF in average water years and 2.2 MAF in dry water years.

Coordinated Long-Term Operation of the CVP and SWP

In June 2004, Reclamation prepared the *Long-Term CVP Operations Criteria and Plan* (OCAP) to provide a description of facilities and the operating environment of the CVP and SWP (Reclamation 2004a). Using operational information in the 2004 OCAP, Reclamation and DWR developed the 2004 *Long-Term CVP and SWP OCAP Biological Assessment* (BA) (Reclamation and DWR 2004), prepared as part of the consultation process required by Section 7 of the Endangered Species Act (ESA). Reclamation consulted with the National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (USFWS) on the 2004 OCAP, and the two agencies issued biological opinions (BO). NMFS issued the 2004 *Biological Opinion on the Long-Term CVP and SWP OCAP* (2004 NMFS BO) (NMFS 2004), and USFWS issued the 2005 *Reinitiation of Formal and Early Section 7 ESA Consultation on the Coordinated Operations of the CVP and SWP and the OCAP to Address Potential Critical Habitat Issues* (2005 USFWS BO) (USFWS 2005). In 2007, the District Court for

the Eastern District of California (District Court), in *Natural Resources Defense Council (NRDC), et al., v. Dirk Kempthorne*, found the 2005 USFWS BO to be unlawful and inadequate. In May 2008, in *Pacific Coast Federation of Fishermen's Associations v. Gutierrez*, the District Court found the 2004 NMFS BO to be unlawful and inadequate. The 2004 NMFS BO and 2005 USFWS BOs were remanded by the District Court to NMFS and USFWS for revision, but were not vacated.

In December 2008, USFWS issued a Revised Biological Opinion on the Coordinated Operations of the CVP and SWP in California (2008 USFWS BO) (USFWS 2008a). In June 2009, NMFS issued the 2009 Final Biological and Conference Opinion on the Long-Term Operations of the CVP and SWP (2009 NMFS BO) (NMFS 2009). The 2008 USFWS BO made a finding that the long-term operations of the CVP and SWP, as described in the 2004 OCAP BA, would jeopardize the continued existence of the delta smelt (*Hypomesus transpacificus*) (USFWS 2008b). The 2009 NMFS BO made a finding that the same operations would jeopardize populations of listed salmonids, steelhead (*Oncorhynchus mykiss*), green sturgeon (*Acipenser medirostris*), and orcas (*Orcinus orca*). Because both agencies made jeopardy determinations, both agencies included a Reasonable and Prudent Alternative (RPA) in their BOs to allow the CVP and SWP to continue without causing jeopardy or adverse modification.

Several lawsuits were filed challenging the validity of the 2008 USFWS BO and 2009 NMFS BO and Reclamation's provisional acceptance of the RPA included with each BO (*Consolidated Salmonid Cases, Delta Smelt Consolidated Cases*). On November 13, 2009, and March 5, 2010, the District Court concluded that Reclamation had violated NEPA by failing to perform a NEPA analysis before provisionally adopting the 2008 USFWS RPA (USFWS 2008b) and 2009 NMFS RPA (NMFS 2009). On December 14, 2010, the District Court found the 2008 USFWS BO (USFWS 2008a) to be unlawful and remanded the BO to USFWS. The District Court issued a similar ruling for the 2009 NMFS BO (NMFS 2009) on September 20, 2011. On May 4, 2011, in the *Delta Smelt Consolidated Cases*, the District Court ordered USFWS to prepare a draft BO by October 1, 2011, which was subsequently extended to an unspecified date to be agreed upon by involved parties. USFWS was ordered to prepare a final revised BO by December 1, 2013. On December 12, 2011, the District Court ordered NMFS to complete a draft BO by

October 1, 2014, and a final BO by February 1, 2016. Reclamation has been ordered to review both of the revised RPAs in accordance with NEPA.

The Departments of the Interior and Commerce, and DWR filed a joint motion in the District Court for a 3-year extension of the current court-ordered deadlines. The request included delaying completion of the USFWS and NMFS BOs and the associated NEPA process for 3 years in favor of implementing a collaborative science and adaptive management program (CSAMP) that is largely targeted at key Delta actions included in the RPAs, and as a test run for adaptive management activities included in the BDCP.

The District Court ruled on April 9, 2013, granting a staged extension. All deadlines related to the BOs and the NEPA process were extended by 1 year, with the potential of two additional 1-year extensions if satisfactory progress is demonstrated. The ruling included a requirement that on February 14, 2014, the parties submit a joint report detailing progress on the CSAMP, providing additional information on CSAMP future activities and describing how the results of the CSAMP will be incorporated into the consultation process. In addition, the parties are required to submit schedules on how CSAMP and the consultations will proceed.

These legal challenges have resulted in uncertainty with regard to operational constraints for the CVP and SWP. As a result, evaluations of potential effects of the alternatives in the Draft Feasibility Report were based on available modeling analysis at this time. Despite the uncertainty surrounding future CVP and SWP long-term operations resulting from ongoing reinitiated consultation processes, the 2008 OCAP BA and the 2008 and 2009 BOs issued by the fishery agencies contain the most recent estimate of potential changes in water operations that could occur in the near future. Furthermore, it is anticipated that the final BOs issued by the resource agencies will contain similar RPAs. However, if ongoing CVP and SWP long-term operations consultation results in operational conditions that deviate substantially from the 2008 OCAP BA and the 2008 and 2009 BOs, these changes may be considered in the Final Feasibility Report.

San Luis Drainage Feature Reevaluation

In June 2006, Reclamation filed the Final EIS for the San Luis Drainage Feature Reevaluation with the U.S. Environmental Protection Agency (EPA). Reclamation prepared the

environmental document, pursuant to NEPA, to evaluate options for providing drainage service to the San Luis Unit of the CVP. The proposed Federal action is to plan and construct a drainage system for the San Luis Unit of the CVP and the general area (of which lands served by the San Luis Unit are a part) that achieves long-term, sustainable salt and water balance in the root zone of irrigated lands. This proposed action would meet the needs of the San Luis Unit for drainage service, fulfill the requirements of a February 2000 Court Order issued in litigation concerning drainage in the San Luis Unit, and be completed under the authority of Public Law 86-488. A ROD was issued in March 2007 (Reclamation 2007a), identifying Reclamation's decision to select the In-Valley/Water Needs Land Retirement Alternative for implementation. The Feasibility Report was transmitted to Congress on July 8, 2008.

San Luis Reservoir Low Point Improvement Project and San Luis Reservoir Expansion

Reclamation and the Santa Clara Valley Water District (SCVWD) initiated feasibility studies of water supply delivery reliability risks associated with algal blooms and low reservoir levels in San Luis Reservoir in 2001 with the San Luis Low Point Improvement Project (SLLPIP) appraisal study. A feasibility study was authorized by Public Law 108-361. The SLLPIP Initial Alternatives Information Report identified raising B.F. Sisk Dam as one alternative to the low-point problem (Reclamation, SCVWD, and San Luis and Delta Mendota Water Authority 2008); however, the alternative was eliminated from study because more cost-effective solutions seemed available at that time (Reclamation, SCVWD, and San Luis and Delta Mendota Water Authority 2011).

In response to studies that determined B.F. Sisk Dam poses a potential risk of seismic failure, Reclamation also initiated a Safety of Dams Corrective Action Study (CAS) in 2006 to determine a course of action to reduce the seismic risks at the dam. Alternatives evaluated in the CAS included raising the dam and adding abutments, as well as restricting the water level in San Luis Reservoir. Reclamation determined that modifications to the dam embankment and dike, spillway, intake towers, and access bridge to increase storage capacity within San Luis Reservoir and reduce Dam safety risk were technically feasible to construct (Reclamation 2013c).

In December 2013, Reclamation completed the San Luis Reservoir Expansion Draft Appraisal Report (2013c). The report recommends further studies in coordination with Reclamation's Dam Safety Office, DWR, SCVWD, and the San Luis & Delta-Mendota Water Authority, and other entities to ensure development of a feasible solution to the several risks to CVP and SWP water delivery reliability. Recommendations in the report include restoring one or more San Luis Reservoir expansion alternatives to the San Luis Low Point Feasibility Studies to determine (1) actions needed to correct identified dam safety risks, and (2) technical, environmental, economic, and financial feasibility of increasing SOD surface water storage capacity under a wide range of future conditions, including climate change and changes in Delta export and conveyance capacity.

Friant-Kern Canal Reverse Flow Project

The San Joaquin River Restoration Settlement Act authorized the construction of pump-back facilities on the Friant-Kern Canal, subject to feasibility and availability of funds from the SJRRP. The facilities would allow the canal to deliver water conveyed from the Cross-Valley Canal north, in reverse of gravity flows; with a capacity of 500 cubic feet per second (cfs) at the Poso Creek and Shafter check structures and 300 cfs at the Lake Woollomes check structure. Reclamation is currently leading the feasibility study for this project.

Friant-Kern and Madera Canals Capacity Restoration Project

The San Joaquin River Restoration Settlement Act authorized the restoration of the Friant-Kern and Madera canals to capacities designed and built by Reclamation, subject to feasibility. The Friant-Kern and Madera canals have developed canal capacity constraints, which limit the delivery of surplus supplies from Friant Dam during wet periods. The Draft of the Environmental Assessment (EA) and Feasibility Report for the Friant-Kern Canal Capacity Restoration Project was released in June 2011 (Reclamation 2011b) and feasibility report was finalized following the public comment period. The EA is expected to be finalized in 2014. Reclamation is currently pursuing implementation in coordination with the Friant Water Authority. Reclamation is currently leading the feasibility study for the Madera Canal Capacity Restoration Project.

U.S. Department of Commerce, National Marine Fisheries Service

NMFS is required under the Federal ESA to assess factors affecting listed salmonid species in the Central Valley, identify recovery criteria, identify the entire suite of actions necessary to achieve these goals, and estimate the cost and time required to carry out the actions.

U.S. Environmental Protection Agency

The EPA develops standards and criteria for water quality pursuant to the Clean Water Act (CWA), and issues permits for discharges under the CWA. In the San Joaquin River watershed and Delta, EPA delegates authority for these activities to the Central Valley Region Water Quality Control Board (Central Valley Water Board, formerly CVRWQCB). The EPA is also involved in projects to improve water quality in the Delta and its watershed. Measure “W” (also known as the Watershed Improvement Measure [WIM] and SP-12) is a key performance measure in EPA’s Strategic Plan. Under Measure W, EPA is tracking where water quality conditions have improved by using a watershed approach. Two watersheds located within the study area, the Grasslands and Salt Slough watershed and the Lower San Joaquin River watershed, are identified as Measure “W” watersheds. Additionally, under the 2012 San Francisco Bay Delta Action Plan (EPA), seven priority activities were identified to advance the protection and restoration of aquatic resources and ensure a reliable water supply in the Bay-Delta Estuary watershed:

- Strengthen water quality standards to protect estuarine habitat
- Advance regional water quality monitoring and assessment
- Accelerate water quality restoration through Total Maximum Daily Loads (TMDLs)
- Strengthen selenium water quality criteria
- Prevent pesticide pollution
- Restore aquatic habitats while managing methylmercury
- Support the Bay Delta Conservation Plan

Under CWA Section 404, the EPA develops regulations for USACE compliance and reviews permits issued by USACE to regulate the discharge of dredged or fill material into waters of the United States, including wetlands. Section 404(c) of the CWA authorizes EPA to veto a USACE decision to issue a permit if a proposed action would have an unacceptable effect on municipal water supplies, shellfish beds and fishery areas, wildlife, or recreational areas.

U.S. Department of the Interior, U.S. Geological Survey, National Water Quality Assessment Program

As part of the National Water Quality Assessment (NAWQA) program initiated by the U.S. Geological Survey (USGS) in 1991, the San Joaquin-Tulare basins study unit was a part of the first decadal cycle of investigations into the quality of water resources conducted to establish existing water quality conditions of streams and aquifers across the Nation. Long-term goals of the NAWQA program are to assess the status of, and trends in, the quality of freshwater streams and aquifers, and to provide a sound understanding of the natural and human factors that affect the quality of these resources. In 2001, NAWQA investigated the quality of water resources in the San Joaquin-Tulare basins again, as part of the second 10-year cycle of the program. While long-term goals remained the same, the emphasis of the renewed investigations shifted from status of water quality to trends in water quality and understanding of natural and anthropogenic factors affecting water quality.

U.S. Department of Defense, U.S. Army Corps of Engineers

The USACE has authority over flood operations and developed the operating rules at Friant Dam and Millerton Lake for flood risk management. In addition to reservoir regulation rules, USACE has conducted various studies and implemented many projects and programs that affect the upper San Joaquin River and its tributaries. Several of the most recent efforts have included the March 1999 Post-Flood Assessment (USACE) and the Sacramento and San Joaquin River Basins Comprehensive Study (Comprehensive Study) (USACE and The Reclamation Board 2002). Additionally, under the CWA Section 404, USACE issues permits to regulate the discharge of dredged or fill material into waters of the United States, including wetlands, and conduct NEPA review of its permitting action.

U.S. Department of the Interior, Bureau of Land Management

The U.S. Department of the Interior, Bureau of Land Management (BLM), San Joaquin River Gorge Management Area (SJRGMA) straddles the San Joaquin River just upstream from Millerton Lake State Recreation Area (SRA) and includes lands on both sides of the San Joaquin River, in both Fresno and Madera counties. BLM management areas are intended to sustain the health, diversity, and productivity of public lands for the use and enjoyment of present and future generations. Approximately 7,000 acres of public land are available for public use via Smalley Road from Auberry (BLM 2010). In 2011, BLM completed the Draft Bakersfield Resource Management Plan (RMP) and EIS, which revises the existing RMPs for the Caliente Resource Area, including the SJRGMA and Hollister Resource Area to address the availability of new data and policies, emerging issues, and changing circumstances (BLM 2011). Some of the uses and resources addressed in the plan include oil and gas leasing and development, alternative energy development, cultural resource management and protection, fire management, land disposals, livestock grazing, recreational use, special area designations, and threatened and endangered species management. BLM issued their Bakersfield Proposed Resource Management Plan and Final EIS in August 2012, and the ROD in February 2013.

U.S. Department of the Interior – Fish and Wildlife Service

USFWS is directed to develop comprehensive conservation management plans to guide the management and resource use for each refuge of the National Wildlife Refuge System under requirements of the National Wildlife Refuge Improvement Act of 1997. Refuge planning policy also directs the process and development of comprehensive conservation management plans. A comprehensive conservation management plan describes the desired future conditions and long-range guidance necessary for meeting refuge purposes. It also guides management decisions and sets forth strategies for achieving refuge goals and objectives within a 15-year time frame.

The San Luis, Merced, and San Joaquin River National Wildlife Refuges (NWR) are located along the San Joaquin River. The San Luis and Merced NWRs do not have approved comprehensive conservation management plans; however, planning was initiated for both NWRs in 2002 (USFWS 2001).

The San Joaquin River NWR has prepared a final comprehensive conservation management plan (USFWS 2006).

State

Following are State studies, projects, programs, and plans relevant to the Investigation.

California Department of Water Resources

DWR owns and operates the SWP and manages ongoing projects or continuing programs relevant to the Investigation.

State Water Project

The SWP delivers water to the Feather River Settlement Contractors and SWP contract entitlements in the Feather River Basin, Bay Area, San Joaquin Valley, Tulare Basin, and Southern California water service areas. The SWP has contracted a total of 4.23 MAF for average annual delivery: about 2.5 MAF for the Southern California Transfer Area; nearly 1.36 MAF for the San Joaquin Valley; and the remaining 370 TAF for the San Francisco Bay, Central Coast, and Feather River areas.

California Water Plan

DWR's *California Water Plan* provides a framework for water managers, legislators, and the public to consider options and make decisions regarding California's water future (DWR 2009d). The plan, which is updated every 5 years, presents basic data and information on California's water resources, including water supply evaluations and assessments of agricultural, urban, and environmental water uses to quantify the gap between water supplies and uses. The plan also identifies and evaluates existing and proposed statewide demand management and water supply augmentation programs and projects to address the State's water needs.

DWR's goal for the *California Water Plan Update 2009* (DWR 2009a) is to meet requirements of the CWC, receive broad support among those participating in California's water planning, and be a useful document for the public, water planners throughout the State, legislators, and other decision-makers (DWR 2009d). As a master plan, it guides the control, protection, conservation, development, management, and efficient use of the water resources of the State (CWC Section 10005(a)).

In January 2009, DWR produced a public review draft of the Water Plan Update (DWR 2009d). The implementation plan contained in the *California Water Plan Update 2009* addresses 13 objectives supported by 92 related actions, which were taken in part from DWR's 2008 climate change white paper

(DWR 2008a). Several other companion State plans were considered in preparing the draft objectives and related actions. Identified objectives address water conservation, recycling, and reuse; conjunctive management of water supply sources; environmental enhancement; flood protection and floodplain enhancement; and management for a sustainable Delta; and identifies several other objectives for management of water resources in California.

DWR and other agencies are currently developing *California Water Plan Update 2013* through rigorous public involvement and State and Federal agency coordination processes.

Conjunctive Water Management Program

DWR's Conjunctive Water Management Program is working with local water agencies and stakeholders throughout the State, including the San Joaquin Valley, to develop partnerships and provide assistance for planning and developing locally controlled and managed conjunctive use programs and projects. Project proposals to be pursued by these local agencies may be considered in the Investigation or in the future without-project conditions.

Central Valley Flood Management Planning Program

The purpose of the Central Valley Flood Management Planning (CVFMP) Program is to conduct sustainable, integrated flood risk management planning for areas protected by facilities of the State-Federal flood protection system in the Central Valley. The program is one of several DWR is implementing within FloodSAFE California (FloodSAFE) to improve Statewide flood risk management and accomplish the goals of Propositions 1E and 84. Several landmark products have been prepared under the CVFMP Program, including a descriptive inventory of State Plan of Flood Control (SPFC) facilities and modes of operation, a Flood Control System Status Report documenting the current condition and performance of SPFC facilities, and the 2012 Central Valley Flood Protection Plan (CVFPP). The 2012 CVFPP was adopted by the Central Valley Flood Protection Board in June 2012, providing a long-term vision for modernizing flood risk management in the Central Valley. CVFPP adoption was supported by a Program EIR. The CVFPP describes current flood risk; defines one primary and four supporting goals for improving flood risk management and related resources; and recommends a State Systemwide Investment Approach for improving the State-Federal flood risk management system. The 2012 CVFPP includes a Conservation Framework outlining approaches for

improving ecosystem functions associated with the flood risk management system. The CVFPP is to be updated every 5 years, starting in 2017. The CVFMP Program is currently conducting CVFPP implementation activities that will refine the policies and physical actions recommended in the 2012 CVFPP.

South Bay Aqueduct Improvement and Enlargement Project

The South Bay Aqueduct conveys water from the Delta through more than 40 miles of pipelines and canals to the Zone 7 Water Agency, Alameda County Water District (ACWD), and SCVWD, which in turn provide service to the cities of Livermore, Dublin, Pleasanton, San Ramon, Fremont, Newark, Union City, Milpitas, Santa Clara, and San Jose (DWR 2009c). The South Bay Aqueduct was the first conveyance facility constructed for the SWP and was designed for a capacity of 300 cfs. Recent flow tests and studies have shown that actual capacity is 270 cfs. The purpose of this project is to increase the capacity of the South Bay Aqueduct to 430 cfs to meet Zone 7 Water Agency's future needs and provide operational flexibility to reduce the SWP's peak power consumption.

The Final EIR was published in December 2004 (DWR). The project includes upgrades to the South Bay Pumping Plant, raised linings on open channel sections of the aqueduct, a 450-acre-foot reservoir, and 4 1/2 miles of pipeline connecting it to the South Bay Pumping Plant. The project was completed in 2012.

North Bay Aqueduct Alternative Intake Project

DWR is proposing the North Bay Aqueduct Alternative Intake Project in Solano County (DWR 2009b). An EIR will be prepared through a collaboration of DWR and local water agencies. DWR proposes an alternate intake to the North Bay Aqueduct that would connect to the existing North Bay Aqueduct via an underground pipeline to serve the contractors and users in Solano and Napa counties. Potential alternative intake (diversion) locations may include sites in Yolo and Sacramento counties. The North Bay Aqueduct Alternative Intake Project also involves modifying the existing North Bay Aqueduct to increase its capacity. Planning efforts for this project are in the preliminary stages. Publication of the Draft EIR is anticipated in 2014.

Delta Stewardship Council

The Delta Stewardship Council was established by the California Legislature as part of the comprehensive water legislation, Senate Bill (SB) 1, in 2009 and is tasked with protecting the Delta and the critical role the Delta serves through implementing two “coequal goals.” The coequal goals are (1) providing a more reliable water supply for California, and (2) protecting, restoring, and enhancing the Delta ecosystem. The coequal goals are to be achieved in a manner that protects and enhances the unique cultural, recreational, natural resource, and agricultural values of the Delta as an evolving place (CWC Section 85054). Members of the council include representatives from different areas of the State who offer diverse expertise in fields, such as agriculture, science, the environment, and public service.

The California Legislature established the Delta Stewardship Council to do the following:

“...provide for the sustainable management of the Sacramento-San Joaquin Delta ecosystem, to provide for a more reliable water supply for the state, to protect and enhance the quality of water supply from the Delta, and to establish a governance structure that will direct efforts across state agencies to develop a legally enforceable Delta Plan.”

The council is entrusted to integrate issues, such as water flows, water quality, environmental protection, emergency management, economics, the Delta as an evolving place, conveyance alternatives, upstream impacts, flood risk management and climate change, into one coherent management system. To that end, the Delta Stewardship Council is developing a Delta Plan and EIR to serve as a basis for future findings of consistency by State and local agencies. The Delta Plan will be a legally enforceable, comprehensive management plan for the Delta and the Suisun Marsh that achieves the coequal goals and all of the inherent subgoals and objectives.

The coequal goals will be achieved in a manner that protects and enhances the unique cultural, recreational, natural resource, and agricultural values of the Delta as an evolving place. The Draft Delta Plan Program EIR was published in November 2011 and outlines a Delta Plan that includes a suite of 12 regulatory policies and 61 non-binding recommendations, as

well as 5 alternative plans (Delta Stewardship Council 2011). During September 2012, the Delta Stewardship Council approved the final draft of the Delta Plan to be the basis for recirculating an additional volume of the Draft Program EIR. The document will also serve as the basis for submittal of a Notice of Proposed Rulemaking to the Office of Administrative Law. The Delta Plan recommends that agencies involved complete the Bay Delta Conservation Plan (BDCP) by December 31, 2014. When completed, the BDCP must be incorporated into the Delta Plan if it meets certain statutory requirements described under CWC 85320 (Delta Stewardship Council 2011). Implementing the Delta Plan in conjunction with the BDCP could change CVP and SWP operations and could possibly affect operations of Friant Dam and Millerton Lake.

California Water Commission

The California Water Commission is tasked with selecting water storage projects for State bond funding toward project benefits “that improve the operation of the state water system, are cost effective, and provide a net improvement in ecosystem and water quality conditions.”

The California Water Commission (Commission) is composed of nine members, responsible for advising the Director of DWR, approving DWR rules and regulations, monitoring and reporting on SWP construction and operations, and holding public hearings on proposed SWP facilities. Additionally, the Commission advises congressional appropriations committees on funding for Reclamation and USACE water resource projects in California.

California’s comprehensive water legislation, SB 1, enacted in 2009, gave the Commission new responsibilities regarding the distribution of public funds set aside for the public benefits of water storage projects, and developing regulations for the quantification and management of those benefits. If passed by California voters, the Safe, Clean, and Reliable Drinking Water Act (SBX7-2) would provide general obligation bond funds for water infrastructure and for various projects and programs to address ecosystem and water supply issues in California, including funds for Statewide Water System Operational Improvement. Eligible projects for Statewide Water System Operational Improvement funding include surface storage projects identified in the CALFED ROD (CALFED 2000a); groundwater storage projects and groundwater contamination prevention or remediation projects that provide water storage benefits; conjunctive use and reservoir reoperation projects; and local and regional storage projects that improve the operation of water systems in the State and provide public benefits.

The Commission is given statutory responsibilities related to the distribution of these funds. Specifically, Sections 79740(c) and 79744, respectively, state:

Projects shall be selected by the Commission through a competitive public process that ranks potential projects based on expected return for public investments as measured by the magnitude of the public benefits provided, pursuant to criteria established under this chapter.

In consultation with the California Department of Fish and Game (DFG), the State Water Resources Control Board (SWRCB), and DWR, the Commission shall develop and adopt, by regulation, methods for quantification and management of public benefits described in Section 79743 by December 15, 2012. The regulations shall include the priorities and relative environmental value of ecosystem benefits as provided by the DFG and the priorities and relative environmental value of ecosystem benefits as provided by the SWRCB.

DWR is currently developing methods to quantify public benefits of water storage projects for consideration by the Commission.

Under the Safe, Clean and Reliable Drinking Water Act, the Commission is further tasked with selecting water storage projects for State bond funding toward project benefits “that improve the operation of the state water system, are cost effective, and provide a net improvement in ecosystem and water quality conditions.” If this bond measure passes, these funds may be eligible for public benefits associated with construction and operation of Temperance Flat Dam and Reservoir.

Delta Vision

The Delta Vision process was initiated by the governor of California through Executive Order S-17-06 establishing an independent Blue Ribbon Task Force responsible for the development of a durable vision for sustainable management of the Delta. The work of the Task Force included two phases, the Delta Vision, which was completed in December 2007, and the Strategic Plan, which was completed in 2008. The Delta Vision

consists of 12 integrated and linked recommendations that are meant to be implemented together over time. Key recommendations included significant increases in conservation and water system efficiency, new water conveyance and storage facilities, and new governance for the Delta region. The Delta Vision also recommended seven near-term actions, which include improving flood protection, ecosystem restoration, and water supply and reliability.

California Department of Fish and Wildlife

The California Department of Fish and Wildlife (CDFW, formerly California Department of Fish and Game [DFG]) manages California's fish and wildlife resources, overseeing the restoration and recovery of species listed by the California Endangered Species Act (CESA) as threatened and endangered. CDFW participates in conservation planning, environmental compliance and permitting, coordinated resources management planning, and restoration and recovery programs within the study area.

State Water Resources Control Board

The State Water Resource Control Board (State Water Board [formerly SWRCB]) is responsible for allocating surface water rights, setting statewide policy to protect water quality, coordinating and supporting the State's nine Regional Water Quality Control Boards, and enforcing laws and regulations protecting the State's waterways.

Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary

In August 1978, the State Water Board adopted the Water Quality Control Plan (WQCP) for the Delta and Suisun Marsh and Water Right Decision 1485 (D-1485), requiring Reclamation and DWR to operate the CVP and SWP to meet all of the 1978 WQCP objectives, except a portion of the south Delta salinity objectives. In 1991, the State Water Board issued revised water quality objectives in the *Delta Water Quality Control Plan for Salinity, Temperature, and Dissolved Oxygen* (State Water Board 1991). In May 1995, the State Water Board adopted the *Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary* (Bay-Delta Plan) (State Water Board 1995) superseding both the 1978 and 1991 plans. Minimum in-stream flow objectives for the San Joaquin River at Vernalis were established under the 1995 Bay-Delta Plan established. The 1995 Bay-Delta Plan was amended in 2006; however, the Vernalis in-stream flow

requirements remained unchanged from the 1995 Bay-Delta Plan.

The State Water Board is currently updating the Bay-Delta Plan, consistent with the 2009 Delta Reform Act. Phase 1 of this work involves updating San Joaquin River flow and southern Delta water quality requirements included in the Bay-Delta Plan. Phase 2 involves comprehensive changes to protect beneficial uses not addressed in Phase 1. Phase 3 involves changes to water rights and other measures to implement changes to the Bay-Delta Plan from Phases 1 and 2. Phase 4 involves developing and implementing flow objectives for priority Delta tributaries outside of the Bay-Delta Plan updates (State Water Board 2014).

CVP and SWP Water Rights

Both the CVP and SWP operate pursuant to water right permits and licenses issued by State Water Board for water storage, releases, and diversions. Over time, the State Water Board has issued decisions that modify the terms and conditions of CVP and SWP water rights.

Beginning in 1996, the State Water Board engaged in proceedings to determine responsibility for meeting water quality standards in the Delta. Because the issues were so complex, the State Water Board divided the water right proceedings into eight phases. The State Water Board completed Phases 1 through 7 of these proceedings in 1999, leading to issuance of Water Rights Decision 1641 (D-1641) in December of 1999 (California Environmental Protection Agency [Cal/EPA], State Water Board 2000). The State Water Board adopted D-1641 as part of the State Water Board's implementation of the 1995 Bay Delta Plan. D-1641 amended certain water rights, including temporarily amending certain terms and conditions of the CVP and SWP water rights, by assigning responsibilities to the persons or entities holding those rights to help meet certain water quality and flow requirements outlined in the 1995 Bay Delta Plan, including new protections for Delta fisheries.

As a result of the 2009 Delta Reform Act, and as described above, the State Water Board has initiated a new administrative process to evaluate water outflow requirements on upstream tributaries to the Delta as a component of updates to the Bay-Delta Plan. This may, if implemented, significantly impact CVP and SWP operations, as well as those of other upstream reservoirs.

Groundwater Ambient Monitoring and Assessment Program

The State Water Board manages the Groundwater Ambient Monitoring and Assessment (GAMA) Program. The primary objective of GAMA is to comprehensively assess statewide groundwater quality and gain an understanding about contamination risk to specific groundwater resources. The Groundwater Quality Monitoring Act of 2001 resulted in a publicly accepted plan to monitor and assess the quality of all priority groundwater basins, which account for over 90 percent of all groundwater used in the State. The plan builds on the existing GAMA Program and prioritizes groundwater basins for assessment based on groundwater use. Uniform and consistent study-design and data collection protocols are being applied to the entire State to facilitate efficient statewide, comprehensive groundwater quality monitoring and assessment. Monitoring and assessments for priority groundwater basins are to be completed every 10 years, with trend monitoring every 3 years. The State Water Board is collaborating with USGS and Lawrence Livermore National Laboratory to implement the GAMA Program.

Central Valley Region Water Quality Control Board

The Central Valley Water Board projects, programs, and plans described below include the Surface Water Ambient Monitoring Program (SWAMP), Conditional Waiver of Waste Discharge Requirements for Irrigated Lands and Impaired Water Bodies 303(d) List, and TMDLs.

San Joaquin River Surface Water Ambient Monitoring Program

The Central Valley Water Board's San Joaquin River SWAMP was implemented in October 2000 as part of the statewide effort to assess and monitor California's surface water quality. The SWAMP within the San Joaquin River Basin was designed with a three-tiered monitoring framework: (1) long-term monitoring in the main stem of the river, (2) long-term monitoring in selected tributaries draining major subbasins, and (3) more intensive monitoring on a 5-year rotation within the subbasins themselves.

Conditional Waiver of Waste Discharge Requirements for Irrigated Lands

A conditional waiver is a regulatory process under California's nonpoint source program plan designed to meet requirements of the CWC (CCRCD 2005). The CWC requires any person who is discharging waste (other than to a community water system) that could affect the quality of the waters of the State within the Central Valley to file a report of waste discharge with the Central Valley Water Board. The CWC requires the Central Valley Water Board to prescribe Waste Discharge Requirements (WDR), or waive WDRs, for the discharge. The Central Valley Water Board's Irrigated Lands Regulatory Program has been under development. In December 2002, the Central Valley Water Board adopted Resolution No. R5-2002-0201, which established a new "Conditional Waiver of WDRs for Discharges from Irrigated Lands within the Central Valley Region." The conditional waiver regulatory requirements are considered to be part of an interim program; a Long-Term Irrigated Lands Regulatory Program is being developed.

Irrigated lands are lands where water is applied for producing crops, including row, field, and tree crops, as well as commercial nurseries, nursery stock production, managed wetlands, and rice production. The Central Valley Water Board adopted a waiver of report of waste discharge and WDRs for three reasons:

1. Central Valley Water Board has limited facility-specific information, and limited water quality data on facility-specific discharges.
2. Because of the high numbers of individual dischargers who discharge waste from irrigated lands, it is infeasible to adopt WDRs within a reasonable period of time.
3. Although dischargers of waste from irrigated lands have caused impairment of State waters, specific information is generally not available on the nature and causes of impairment, and management practices that mitigate impairments.

The conditions of the conditional waivers will result in development of new and additional information that could provide a more reasonable basis for adoption of individual or general WDRs, where necessary, in the future.

Impaired Water Bodies 303(d) List and Total Maximum Daily Loads

In 2006, the EPA approved the Central Valley Water Board's 303(d) list for portions of the San Joaquin River downstream from Friant Dam that do not meet, or are not expected to meet, water quality standards, or are considered impaired. Millerton Lake is listed in the draft 2008 update to CWA Section 303(d) listings for mercury (Central Valley Water Board 2009). The 2010 CWA Section 303(d) listings for portions of the San Joaquin River from Friant Dam to the Merced River include invasive species, arsenic, boron, chlorpyrifos, diazinon, dichlorofiphenyl-trichloroethane (DDT), electrical conductivity (EC), *Escherichia coli* (E. coli), Group A pesticides, mercury, selenium, and unknown toxicity (State Water Board 2010). TMDLs and Basin Plan amendments are currently in place for diazinon and chloropyrifos runoff into the San Joaquin River. TMDLs and Basin Plan amendments are currently being developed for selenium, salt and boron, and pesticides. Delta waterways fall within the jurisdiction of both the Central Valley Water Board and the San Francisco Bay Region Water Quality Control Board (San Francisco Bay Water Board, formerly SFBRWQCB. Various Delta waterways in the areas under jurisdiction of the Central Valley Water Board are listed under CWA Section 303(d) as impaired for chlordane, chlorpyrifos, DDT, diazinon, dieldrin, electrical conductivity, Group A pesticides, invasive species, mercury, polychlorinated biphenyls (PCB), and unknown toxicity (State Water Board 2010). Delta waterways in the area under jurisdiction of the San Francisco Bay Water Board are listed under CWA Section 303(d) as impaired for chlordane, DDT, dieldrin, dioxin, furan compounds, invasive species, mercury, PCBs, and selenium (State Water Board 2010).

Federal-State

Following are programs and plans relevant to the Investigation that were developed or are being developed as collaborations between Federal and State agencies.

CALFED

CALFED is a collaborative effort among 25 State and Federal agencies and representatives of California's environmental, urban, and agricultural communities to improve water quality, fish and wildlife habitat, and water supply reliability in the Bay-Delta, the hub of the State's water distribution system. The lead CALFED agencies released the Final Programmatic EIS Preferred Alternative on July 21, 2000, followed by the signing of the CALFED Bay-Delta Programmatic ROD on August 28, 2000, establishing a 30-year plan for improving water supplies and the Bay-Delta ecosystem (CALFED 2000a).

The CALFED ROD identified 12 action plans for the Governance, Ecosystem Restoration, Watersheds, Water Supply Reliability, Storage, Conveyance, Environmental Water Account, Water Use Efficiency, Water Quality, Water Transfer, Levees, and Science programs. The CALFED agencies then began implementing Stage 1 of the ROD, including the first 7 years of a 30-year program to establish a foundation for long-term actions. In 2004, the CALFED Bay-Delta Authorization Act (Public Law 108-361) approved the CALFED ROD (CALFED 2000a) as a "general framework for addressing the CALFED Bay-Delta Program" (Section 103 (a) (1)). Further, Public Law 108-361 authorized the Secretary of the Interior to carry out the activities described in Paragraphs (1) through (10) of Subsection (d), which includes "planning and feasibility studies for the following projects requiring further consideration: (II) the Upper San Joaquin River storage in Fresno and Madera Counties" (Section 103 (d) (1) (A) (ii)).

CALFED Surface Water Storage Program

Results of initial evaluations to formulate this program were presented in the Integrated Storage Investigation Report – Initial Surface Water Storage Screening (CALFED 2000b), which assessed and screened numerous potential reservoir sites. Of many potential surface water storage projects considered, five were included in the Preferred Program Alternative for consideration during early phases of CALFED implementation. Reclamation and DWR committed to assume lead agency roles for investigation of these sites and to work with other CALFED agencies in pursuing their implementation. The five surface water storage projects are

Enlarge Shasta Lake, In-Delta Storage, Los Vaqueros Reservoir Enlargement, Sites Reservoir (also known as North-of-the-Delta Offstream Storage [NODOS]), and Upper San Joaquin River Basin Storage.

Common Assumptions for Water Storage Projects

A Common Assumptions Work Group was established to develop common baseline conditions against which the various water storage investigations would assess the feasibility of proposed projects. A major task of the Common Assumptions effort was to develop common analytical tools. The work group assembled a number of modeling tools under one package, termed the Common Model Package (CMP).

The CMP includes the California Statewide Simulation Model (CalSim II), Delta Simulation Model (DSM2), Sacramento River Water Quality Model (SRWQM), the Salmonid Population Model (SALMOD), LongTermGen (LTGen), SWP Power California (SWP Power), the Least Cost Planning Simulation Model (LCPSIM), and the Statewide Agricultural Production Model (SWAP). CalSim II is a statewide water resources planning model, primarily reflecting the Central Valley and Delta operations of the CVP and SWP. The model is used to evaluate water supply facilities and demands; regulatory standards, including minimum flow requirements, water rights, contracts, and water quality standards; system operations; and likely foreseeable actions. DSM2 simulates hydrodynamic and water quality conditions in the Delta. Temperature and fisheries models specific to the San Joaquin River were incorporated in the Investigation and are described in the Modeling Appendix.

San Joaquin River Restoration Program

In 1988, a coalition of environmental groups, led by the NRDC, filed a lawsuit challenging the renewal of long-term water service contracts between the United States and water contractors in the Friant Division of the CVP. A litigation Stipulation of Settlement (Settlement) among the NRDC, FWUA, and the U.S. Departments of Commerce and Interior in the case of *NRDC, et al., v. Kirk Rodgers, et al.* was approved in late 2006 by the District Court (NRDC et al. 2006; Reclamation, FWUA, and NRDC 2006). The Settlement ended an 18-year legal dispute over the operation of Friant Dam and resolved longstanding legal claims brought by a coalition of conservation and fishing groups led by the NRDC.



San Joaquin River below Friant Dam

The San Joaquin River Restoration Settlement Act, included in Public Law 111-11 and signed into law on March 30, 2009, authorizes and directs the Secretary of the Interior to implement the Settlement. The Settlement establishes two goals. The Restoration Goal is to restore and maintain fish populations in "good condition" in the main stem of the 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. The Water Management Goal is to reduce or avoid adverse water supply impacts to all of the Friant Division long-term contractors that may result from the Interim Flows and Restoration Flows provided for in the Settlement. Settlement Paragraphs 11 through 16 describe the physical and operational actions considered necessary for achieving the Restoration and Water Management goals.

The Settlement provides for substantial river channel improvements and sufficient water flow to sustain a salmon fishery upstream from the confluence of the Merced River tributary, while reducing or avoiding the water supply impacts of implementing the Settlement on the Friant Division long-term water contractors. At the heart of the Settlement is a commitment to provide continuous flows in the San Joaquin River in the 153-mile stretch of the San Joaquin River between Friant Dam and the Merced River (the Restoration Area).

Accomplishing the Restoration Goal will require funding and constructing extensive channel and structural improvements in many areas of the river, including some that have been without flows (except for occasional flood releases) for decades. Restoring continuous flows to the approximately 60 miles of the San Joaquin River will occur in phases through the SJRRP. Planning, design work, and environmental reviews began in 2006, and Interim Flows for experimental purposes began in 2009. Restoration Flows began January 1, 2014. The flows will be increased gradually over the next several years up to the full flows specified in the Settlement, as channel capacity allows. The Settlement continues into perpetuity. After 2026, the District Court, in conjunction with the State Water Board, will consider any requests by the parties for changes to the Restoration Flows.

Reclamation is the Federal lead agency for the SJRRP. DWR is the State lead agency. Along with Reclamation and DWR, NMFS, USFWS, and CDFW are implementing agencies.

The SJRRP is assumed to be implemented in the future without-project conditions and No Action Alternative for the Investigation.

Temperance Flat RM 274 Reservoir would...

- change water management at Friant Dam and affect the Restoration and Water Management goals of the Settlement being implemented through the SJRRP.
- not interfere with the release of Restoration Flows.
- reduce the frequency and magnitude of flood releases from Friant Dam that would occur in excess of water rights, Restoration Flow releases, and water deliveries.
- increase the volume of cold water and improve operational flexibility in the management of Restoration Flows.
- provide additional flow in the San Joaquin River from Friant Dam to Mendota Pool (for water supply exchanges).
- increase the volume of Restoration Flows eligible for recapture at locations downstream of the Restoration Area, under Paragraph 16(a) of the Settlement.
- reduce the availability of \$10 water under Paragraph 16(b) of the Settlement and could reduce the effectiveness of projects that would increase the delivery of Paragraph 16(b) water.

**See Chapter 3 for more information regarding the potential effects of Temperance Flat RM 274 Reservoir on the SJRRP.*

Specific efforts under the SJRRP that are of particular importance for achieving the primary objective of enhancing conditions in the San Joaquin River in support of restoring and maintaining naturally reproducing and self-sustaining anadromous fish include fish reintroduction efforts and the Mendota Pool Bypass and Reach 2B Improvements Project.

Fish Reintroduction Efforts

Since 2009, Reclamation, USFWS, CDFW and DWR have been conducting fisheries studies in the San Joaquin River between Friant Dam and the Merced River to evaluate the requirements and the survival of Chinook salmon eggs after spawning, and juveniles during the spring downstream migration. They are also assessing the habitat conditions, including water temperatures, water quality, and spawning gravel. In 2013, the SJRRP completed the second consecutive year of collect-and-transport activities near the Merced River Confluence for fall-run Chinook salmon, with adult Chinook salmon released at Camp Pashayan near Highway 99. On December 31, 2013, NMFS published an Endangered Species Act 10(j) rule for a nonessential experimental population designation for spring-run Chinook salmon in the San Joaquin River between Friant Dam and the Merced River confluence. As a result, the SJRRP anticipates release of Feather River Hatchery spring-run Chinook salmon in second quarter 2014.

Mendota Pool Bypass and Reach 2B Improvements Project

Paragraph 11(a)(1) and 11(a)(2) of the Settlement specify actions to construct the Mendota Pool Bypass and modify Reach 2B. The Mendota Pool Bypass and Reach 2B Improvements Project includes the construction of the Mendota Pool Bypass and channel improvements in Reach 2B of the San Joaquin River to convey at least 4,500 cfs (incorporating new floodplain and related riparian habitat) between the Chowchilla Bifurcation Structure and the new Mendota Pool bypass channel. The Mendota Pool Bypass would convey at least 4,500 cfs from Reach 2B to Reach 3 and would include a fish barrier to direct adult salmon migrating upriver into the bypass. Modifications to Reach 2B would include levee setbacks to increase channel and floodplain capacity and provide floodplain habitat. Currently, Reclamation is working with landowners adjacent to Mendota Pool and the San Joaquin River to acquire agricultural easements necessary for project implementation.

Bay Delta Conservation Plan

The BDCP is being prepared through a collaboration of Federal, State, and local water agencies, Federal and State fish agencies, environmental organizations, and other interested parties. The goal of the BDCP is to identify water flow and habitat restoration actions to recover endangered and sensitive species and their habitats in the Delta while improving California's water supply reliability.

The BDCP is a Habitat Conservation Plan (HCP) intended to provide for the conservation of species and habitats covered by the plan. HCPs and Natural Community Conservation Plans (NCCP) are planning documents required as part of permit applications under Section 10(a) of the ESA and California Natural Community Conservation Planning Act (NCCPA). The BDCP is intended as a comprehensive conservation strategy for the Delta, designed to advance the coequal planning goals of restoring ecological functions of the Delta and improving water supply reliability for large portions of California.

A range of alternatives for providing species/habitat protection and improving water supply reliability as part of the BDCP will be evaluated through development of an EIS/EIR. Lead agencies for the EIS/EIR are DWR, Reclamation, USFWS, and NMFS, in cooperation with CDFW, EPA, and USACE. The BDCP Draft EIS/EIR was released for public review and comment in December 2013.

Currently, several alternative Delta conveyance facilities are being evaluated as part of the plan. Among these alternatives are a through-Delta facility and an isolated facility that would convey water around the Delta for local supply and export through a hydraulically isolated channel or tunnel. An isolated facility could improve water quality for urban and agricultural water users and could eliminate reverse flow in the Delta and improve Delta water quality and flow by releasing water to south Delta channels. Increasing surface water storage in the upper San Joaquin River Basin could allow for increased system flexibility and further use of new Delta conveyance facilities, providing for even greater increases in water supply reliability.

Millerton Lake Resource Management Plan and General Plan

The Millerton Lake RMP/General Plan (GP) Final EIS/EIR was completed in 2010 (Reclamation and California Department of Parks and Recreation [State Parks] 2010). The RMP/GP is a long-term plan that guides future actions in the plan area and is based on a comprehensive inventory of environmental resources and facilities and input from State Parks; local, State, and Federal agencies; and the general public. The purpose of the RMP/GP is to provide a program and set of policy guidelines necessary to encourage orderly use, development, and management of the surrounding lands. The RMP/GP provides outdoor recreational opportunities, enhanced by Millerton Lake and its shoreline, compatible with the surrounding scenic, environmental, and cultural resources. In addition, the RMP/GP proposes uses that will be compatible with the obligation to operate the reservoir for delivery of high-quality water (Reclamation and State Parks 2010). Under the Preferred Alternative in the RMP/GP EIS/EIR, current recreational uses and public access at Millerton Lake would be enhanced to attract more visitors and increase recreational opportunities, while protecting natural resources with new or modified land and recreation management practices (Reclamation and State Parks 2010).

San Joaquin River Salinity Management Plan and Grasslands Bypass Project Extension

Reclamation has a Management Agency Agreement (MAA) with the Central Valley Water Board to meet the San Joaquin River salinity objective at Vernalis and implement a TMDL program to meet the San Joaquin River salt and boron objectives at Vernalis through activities identified in its Salinity Management Plan. This plan outlines actions used for management of water quality to improve salt, boron, and other constituent conditions on the lower San Joaquin River. The plan was developed in conjunction with the MAA and focuses on three major groups of actions taken by Reclamation: providing flows to the system, reducing salt load to the river, and facilitating mitigation.

The TMDL could be implemented through a base load allocation plus offset or mitigation activities, or through the Central Valley Water Board adoption of a stakeholder-developed Real Time Management Program. The first TMDL compliance deadline for Reclamation and westside discharges is July 2014. Reclamation is also evaluating alternatives for a

programmatic management approach to meet the salt and boron TMDLs by 2014.

Salt load reduction actions include the Grassland Bypass Project, which is designed to improve water quality in the channels used to deliver water to wetland areas and the San Joaquin River. Before the Grassland Bypass Project was implemented, drainage water from farms in the 97,000-acre Grassland Drainage Area was discharged into the San Joaquin River through Salt Slough and other channels used to deliver water to wetland areas. This drainage water contains high concentrations of selenium, salts, boron, and other constituents that are harmful to wildlife (Reclamation 2004b).

The Grasslands Bypass Project Extension (2010 – 2019) extends the San Luis Drain Use Agreement to allow time to acquire funds and develop feasible drainwater treatment technology to meet revised Basin Plan objectives and waste discharge requirements by December 30, 2019; continues the separation of unusable agricultural drainage water discharged from the Grasslands Drainage Area from wetland water supply conveyance channels for 2010 – 2019; facilitates drainage management that maintains the viability of agriculture in the Grasslands Bypass Project Area; and promotes continuous improvement of water quality in the San Joaquin River.

Delta-Mendota Canal/California Aqueduct Intertie

The Delta-Mendota Canal (DMC)/California Aqueduct Intertie consists of a pumping plant and pipeline connection between the DMC and the California Aqueduct in the Delta. The intertie could be used in a number of ways to achieve multiple benefits, including meeting current water supply demands, allowing for the maintenance and repair of CVP Delta export and conveyance facilities, and providing operational flexibility to respond to emergencies related to both the CVP and SWP. The intertie includes a 450 cfs pumping plant at the DMC that allows water to be pumped from the canal to the California Aqueduct via an underground pipeline. Reclamation and DWR have completed NEPA and CEQA documentation for this project. The Notice of Intent (NOI)/Notice of Preparation (NOP) was released in 2006, public scoping meetings were held in August 2006, and the Draft EIS was released for public comment in July 2009. The Final EIS and ROD were filed in December 2009 and construction began in October 2010. The project was completed in May 2012.

Lower San Joaquin River Feasibility Study

The Lower San Joaquin River Flood Feasibility Study is a cooperative effort among USACE, the State Central Valley Flood Protection Board, and San Joaquin Area Flood Control Agency (SJAFCA) to determine needed improvements for future flood protection systems in an effort to reach or exceed 200-year flood protection. The feasibility study is a multi-year, \$10 million study that covers the southern part of San Joaquin County along the San Joaquin River, up to and through Stockton, as well as the watersheds east of Stockton (SJAFCA 2013). The draft feasibility report and EIS is currently scheduled to be completed in 2016.

South Delta Improvements Program

The South Delta Improvement Program (SDIP) is a series of proposed actions to improve water quality and protect salmon in the southern part of the Delta while allowing the SWP to operate more effectively to meet water needs. DWR and Reclamation completed the Final EIS/EIR for the SDIP and entered the permitting phase for the installation and operation of permanent operable gates in the south Delta (DWR 2013b). ESA consultation for the operation of the permanent operable gates proposed by the SDIP was included in the OCAP. The 2009 NMFS BO specifically directs DWR to halt SDIP implementation. Consultation for the SDIP cannot be reinitiated until after 3 years of fish predation studies at the south Delta temporary barriers. DWR could proceed with construction after permits have been acquired. There currently is not a schedule for project completion (DWR 2013b).

Franks Tract Project

Reclamation and DWR are proposing to implement the Franks Tract Project to improve water quality in the Delta. Operable gates would be installed to control the flow of water at one of two locations on either Threemile Slough or West False River. The project gates would be operated seasonally (January through September) and during certain hours of the day, depending on fish presence and tidal conditions. The Franks Tract Project is consistent with ongoing planning efforts for the Delta to help balance competing uses and to create a more sustainable system for the future. The North/Central Delta Improvement Study (Delta Cross Channel, Franks Tract, and Through-Delta Facility Evaluation) recommended alternatives include constructing an operable gate on Threemile Slough and an operable gate on West False River for further analysis (Reclamation 2010a). The Franks Tract Project has been delayed.

Regional and Local

Following are regional and local activities relevant to the Investigation.

San Joaquin River Exchange Contractors Water Authority Water Transfer Program 2005 – 2014

The San Joaquin River Exchange Contractors Water Authority (Exchange Contractors) and Reclamation completed an EIS/EIR to support a 10-year program, from 2005 to 2014, to allow the transfer of up to 130 TAF of substitute water from the Exchange Contractors to other water users (Reclamation and San Joaquin River Exchange Contractors Water Authority 2004). A maximum of 80 TAF of water would be developed from conservation measures, including tailwater recovery and groundwater pumping, and a maximum of 50 TAF would be developed from temporary land fallowing.

San Joaquin River Exchange Contractors Water Authority Water Transfer Program 2014 – 2038

The Exchange Contractors and Reclamation completed a EIS/EIR to support a 25-Year Water Transfer Program, from 2014–2038, to allow the transfer of up to 150 TAF of substitute water from the Exchange Contractors to other water users (Reclamation and Exchange Contractors 2013). Under the 25-Year Water Transfer Program, the existing water transfer of up to 80 TAF via conservation measures (primarily tailwater recovery) would continue, up to 50 TAF of water could be made available via land fallowing, and up to 20 TAF of conserved water could be made available under certain specified conditions, for a total water transfer amount of up to 150 TAF. Finally, the 25-Year Water Transfer Program includes the transfer and/or exchange of the transferred water described above to not only those CVP contractors who were included in the existing program but also to other CVP and SWP contractors in Alameda, Contra Costa, Monterey, Santa Cruz, and Kern counties (other receiving areas).

Vernalis Adaptive Management Program and San Joaquin River Agreement

The Vernalis Adaptive Management Program (VAMP) was a 12-year experimental management program, which the State Water Board accepted as the implementation of the San Joaquin River flow standard pursuant to D-1641. It was initiated to protect juvenile Chinook salmon emigrating through the San Joaquin River and Delta, and to evaluate how Chinook salmon survival rates change in response to alterations in San Joaquin River flows and exports at CVP and SWP

facilities in the south Delta when the Head of Old River Barrier is installed. A water acquisition program for in-stream flows and monitoring program for VAMP were implemented through the San Joaquin River Agreement (SJRA), which was adopted in 2000 and twice extended, finally expiring in December 2011. Signatories to the SJRA included Reclamation, DWR, CDFW, USFWS, San Joaquin River Group Authority and member agencies, Exchange Contractors, and select CVP and SWP Contractors, San Francisco Public Utilities Commission, and several environmental interest groups.

The expiration of VAMP in 2011 introduced uncertainty regarding responsibility for meeting San Joaquin River flow standards set forth in the 1995 Bay Delta Plan in the interim until new San Joaquin River flow standards are identified. Merced Irrigation District has and will continue to meet its fall pulse flow requirements and commitments. Reclamation entered into a two-year agreement with Merced Irrigation District to continue to provide VAMP-like spring pulse flows in the San Joaquin River at Vernalis. However, that agreement expired on December 31, 2013. It is unclear whether Reclamation will be able to continue to acquire water from willing sellers to meet VAMP-like spring pulse flow targets in the San Joaquin River. Concurrently, Reclamation is participating in the San Joaquin Tributary Settlement Process. The goal of the San Joaquin Tributary Settlement Process is to collaboratively develop an implementation plan for San Joaquin River flow objectives that satisfies all requirements set by regulatory agencies and their ongoing regulatory processes, including the State Water Board's Bay-Delta Plan update and ongoing FERC processes on the Merced and Tuolumne rivers while minimizing impacts to water supply and other beneficial uses.

Big Creek Facilities Relicensing

Southern California Edison (SCE) owns and operates seven hydroelectric projects, collectively comprising the Big Creek System, in the eastern portion of the upper San Joaquin River Basin upstream from Kerckhoff Lake. SCE is completing a multiyear collaborative process for relicensing four of its seven Big Creek hydroelectric projects. The Federal Energy Regulatory Commission (FERC) provided approval to SCE on March 15, 2000, to use an Alternative Licensing Process (ALP) to relicense four of the seven projects (SCE 2000). A settlement agreement was signed during April 2007 by SCE and more than 45 diverse stakeholders. The settlement agreement calls for extensive plans to mitigate project-related

effects on aquatic, terrestrial, and cultural resources, and improve land and recreation management (SCE 2007) and will become effective once FERC has issued an Order Issuing New License for any of the four facilities. The FERC Final EIS for Hydropower Licenses Big Creek ALP Projects was released on March 13, 2009 (FERC 2009).

Kerckhoff Hydroelectric Project

The Pacific Gas and Electric Company (PG&E) owns and operates the Kerckhoff Hydroelectric Project, consisting of Kerckhoff Powerhouse and Kerckhoff No. 2 Powerhouse. On November 27, 2012, PG&E filed an application with FERC to retire Kerckhoff No. 2 Powerhouse (PG&E 2012). The application constitutes a non-capacity amendment as it does not propose enlarging the capacity of the project. The license for the Kerckhoff Hydroelectric Project expires November 30, 2022.

Friant Water Users Authority and Metropolitan Water District of Southern California Partnership Studies

FWUA and Metropolitan Water District of Southern California (MWD) entered into a partnership, based on an approved set of principles, to investigate the potential of enhancing water supply and affordability in the eastern San Joaquin Valley while improving water quality for Southern California water users. The partnership was based on the desire by both parties to investigate joint water management projects that could be implemented for mutual benefit of the agencies, their members, and water users. Studies performed as a part of this partnership include potential enlargement of Mammoth Pool Reservoir and exchange opportunities between Friant Division of the CVP and Delta water supplies.

Additional studies by FWUA and MWD considered operations to accomplish exchanges that would deliver high-quality water from the Friant Division of the CVP to MWD in exchange for water supplies delivered from the Delta. Information from these studies provided preliminary operational assumptions for the Investigation related to the integration of Friant Division facilities with other CVP and/or SWP facilities.

Integrated Regional Water Management

In 2002, the State passed SB 1672, the Integrated Regional Water Management Planning Act, to provide bond funds to regional water management work groups statewide. The purpose of Integrated Regional Water Management (IRWM) is to comprehensively address water supply, quality, flood risk

and ecosystem challenges through a collaborative planning and implementation framework of regional partners. Forty-eight regional water management groups now cover almost 90 percent of the State's geographic area. IRWM regions in the Investigation study area include Eastern San Joaquin, Madera County, Merced County, East Stanislaus, Tuolumne-Stanislaus, Westside San Joaquin, Kaweah River Basin, Kern County, Poso Creek, Tule, and Upper Kings Basin.

Westside Regional Drainage Plan

The Westside Regional Drainage Plan was developed by the Exchange Contractors, Broadview Water District, Panoche Water District, and Westlands Water District to quick-start identified drainage elements identified in the San Luis Drainage Feature Reevaluation feasibility study. Implementing the Westside Regional Drainage Plan is assumed to result in the elimination of salt discharges to the San Joaquin River from the Grasslands Drainage Area. The Westside Regional Drainage Plan seeks to manage subsurface drainage and achieve a salt balance on productive lands through several mechanisms, including the application of drainage to salt-tolerant crops at a regional reuse facility to reduce the volume of water discharged into Mud Slough (North) and improve the water quality of that discharge. An element of the Westside Regional Drainage Plan is the San Joaquin River Water Quality Improvement project. For this project, the Panoche Water District evaluated the acquisition of up to 2,900 acres of land to expand the existing 4,000-acre Phase I In-Valley Treatment/Drainage Reuse Facility to reach up to 6,900 acres of reuse area within the Grassland Drainage Area. The proposed project would also install minor conveyance modifications and plant salt-tolerant crops.

San Joaquin River Parkway Master Plan

The San Joaquin River Parkway Master Plan was certified and adopted in December 1997 by the San Joaquin River Conservancy (SJRC). The plan is a conceptual, long-range planning document intended to help preserve, enhance, and provide for enjoyment of the natural landscape of the San Joaquin River corridor. The San Joaquin River Parkway is a planned 22-mile natural area and wildlife corridor extending from Friant Dam to State Route 99 on both sides of the San Joaquin River, and includes portions of Fresno and Madera counties and the City of Fresno (SJRC 2000).

The SJRC is mandated to implement the San Joaquin River Parkway Master Plan. Implementation of the plan includes

acquiring approximately 5,900 acres of land from willing sellers at fair market value; improving, operating, and managing those lands for public enjoyment consistent with protection of natural and cultural resources; and protecting, enhancing, and restoring riverine and floodplain habitat and ecological diversity (SJRC 2013).

The SJRC issued a NOP of the Draft EIR for the San Joaquin River Parkway Master Plan Update in June 2013. The Master Plan Update development and implementation may consist of acquisition of lands; revegetation, restoration, and enhancement of habitats on lands; and development, operation, and maintenance of trails (SJRC 2013).

City of Stockton Delta Water Supply Project

The Delta Water Supply Project is a new supplemental high-quality water supply for the Stockton metropolitan area, diverting Delta water from a new intake on the San Joaquin River. A raw water pipeline along Eight Mile Road was built to convey the Delta water to a new drinking water treatment plant. The water treatment plant was completed and dedicated on May 30, 2012.

Semitropic Water Storage District Groundwater Banking Project

The Semitropic Groundwater Storage Bank began operation in 1990 and is one of the largest groundwater banking programs in the world. The purpose of the Semitropic Water Storage District (WSD) groundwater banking program is to provide water for agricultural and urban use during drought years. Currently, six banking partners commit surplus water to Semitropic WSD in wet years: MWD, SCVWD, ACWD, Newhall Land and Farming Company, Zone 7 Water Agency, and San Diego County Water Authority. These partners have delivered approximately 700 TAF of water to Semitropic WSD, and more storage will become available when the expansion of the facility is complete.

The program's board of directors comprises local farmers who are elected to 4-year terms, and serve the agricultural area in Semitropic WSD. The district is located between the CVP Friant-Kern Canal and the SWP California Aqueduct, near Wasco, California, in Kern County. The bank's geographical location and sandy soil composition make it an ideal location for a groundwater banking program.

The Semitropic WSD groundwater banking program currently banks 700 TAF of water with a total expanded capacity of 1.65 MAF; approximately 450 TAF of storage are available for use. Semitropic WSD could provide a guaranteed 290 TAF per year to banking partners with a maximum withdrawal rate of 423 TAF per year (delivered into the California Aqueduct), and could recharge a guaranteed 140.5 TAF per year with a maximum of 400 TAF per year. Water could be recovered from groundwater storage quickly with high-flow wells that pump water at 300 cfs (405 gallons per minute) (Semitropic WSD 2004).

Total capacity, recharge, and withdrawal rates and totals are based on the intake facility's expansion project, which is currently permitted and ready for construction. Once the facility is completed, the water bank's capacity will be equivalent to approximately 18 percent of the entire SWP yield (Semitropic WSD 2004).

Fresno County HCP/NCCP

In 2008, USFWS awarded a grant to Fresno County to support the development of an HCP/NCCP through baseline surveys and inventories, document preparation, outreach and similar planning activities. Fresno County is developing a multi-species HCP/NCCP to conserve agricultural lands and natural habitats that may be at risk from urban development.