

# **San Joaquin River Restoration Program**

Fiscal Year 2014/2015 Annual Report

**California Department of Fish and Wildlife**

Central Region

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## **EXECUTIVE SUMMARY**

This report details California Department of Fish and Wildlife (CDFW) activities during the state fiscal year (FY) 2014/2015, from July 2014 through June 2015.

The San Joaquin River Restoration Program (SJRRP or Program) is the culmination of 18 years of litigation between the Natural Resources Defense Council (NRDC) and the United States and Friant Division contractors of the Central Valley Project (CVP). This lawsuit, known as *NRDC, et al., v. Kirk Rodgers, et al.*, reached a Stipulation of Settlement (Settlement) on September 13, 2006. The Settlement includes both Restoration and Water Management goals. The State's participation in the Program, via the Department of Water Resources (DWR) and CDFW, is directed by the terms in the Memorandum of Understanding (MOU) between the Settling Parties and the State, effective for the duration of the Settlement and terminating on December 31, 2026.

CDFW participates in the SJRRP at nearly all levels as described in the Program Management Plan (SJRRP 2007). The core CDFW team of nine permanent employees and nine temporary employees have been engaged in salmon reintroduction actions and planning, fish facility operations, research, and monitoring efforts supporting the population and habitat goals, site-specific planning, recreation, drought management, environmental compliance and permitting, and public outreach.

### **Key accomplishments in Fiscal Year 2014/2015:**

- CDFW had the ability to move forward with support for implementation of Program actions following certification of the Final Environmental Impact Report for Salmon Conservation and Research Facility and Related Management Actions Project (EIR) in FY 2013/2014. To date, the EIR has enabled CDFW to pursue monitoring and research actions and has streamlined attaining necessary approvals for drought response implementation, recreation enhancements, and Salmon Conservation and Research Facility (SCARF) construction.
- The second phase of SCARF construction (working drawings) was approved and initiated. The second phase should be completed in late 2015, and CDFW will seek approval to begin the final phase of construction in early 2016.
- Drought conditions severely impacted Program implementation with historic high temperatures and reduced flows affecting Interim Facility operations and fishery studies. Drought funding made it possible to install a temporary chiller at the Interim Facility and pursue enhancements to increase space and water quality to mitigate the effects of drought at the Interim Facility and Satellite Incubation and Rearing Facility (SIRF). Funding also enabled CDFW to enhance monitoring activities and move fish around unsuitable reaches.

- Despite drought impacts, the Interim Facility continued development at the proposed SCARF site adjacent to the San Joaquin River State Fish Hatchery (SJRH). The Interim Facility continued to raise three brood years (BY) of spring-run Chinook: BYs 2012, 2013, and 2014. BY 2014 was brought to the facility during the spring of 2015. The first BY should be ready to spawn in the fall of 2015 to produce approximately 50,000 juveniles for release in the San Joaquin River in the spring of 2016.
- The second juvenile spring-run release took place in February when 54,000 juveniles were translocated from Feather River Hatchery (FRH). Additional measures were taken to ensure survival in drought conditions by limiting holding periods and releasing at the downstream end of the Restoration Area.
- CDFW collaborated with Program partners to hold the second annual Salmon Fest at Lost Lake Recreation Area near Fresno in November 2014 and the third annual Sycamore Island Fishing Derby in March 2015. Both events were well-attended with a favorable public response.
- CDFW continued sport-fishing outreach and recreation enhancements by coordinating with the San Joaquin River Conservancy, the San Joaquin River Parkway and Conservation Trust, and DWR to plan access improvements at the Sycamore Island Trout Pond; and conducting seminars at Herb Bauer Sporting Goods and the Fresno County Sportsmen's Club.
- A Revised Framework for Implementation (SJRRP 2015) was drafted with CDFW assistance to establish a realistic schedule for the implementation of the SJRRP based upon the best available technical, biological, schedule, and funding information. This effort updated and refined the schedule and associated future funding needs.
- CDFW staff continued to assist with and independently carry out monitoring activities and studies including: monitoring Chinook salmon (*Oncorhynchus tshawytscha*) survival, trap and haul of adult fall-run Chinook salmon from Reach 5 to Reach 1, artificial spawning of trapped adults and rearing of their offspring for release, stream temperature monitoring, habitat mapping, and egg survival and spawning habitat studies. The 2014 trap and haul effort moved 510 adults to Reach 1, compared to 367 in the fall of 2013. Artificial spawning yielded approximately 18,000 fall-run juveniles for studies, compared to 37,000 in 2013.
- CDFW staff continued to participate in various technical and program management working groups, and attended and supported numerous public workshops, interagency meetings, and public tours. CDFW staff also assisted with and completed appropriate environmental disclosure documents associated with California Environmental Quality Act (CEQA), National Environmental Policy Act (NEPA) and permits necessary for site-specific actions and monitoring activities.

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## ACRONYMS AND ABBREVIATIONS

ACOE	United States Army Corps of Engineers
ATR	Annual Technical Report
BA	Biological Assessment
BO	Biological Opinion
BY	brood year
California HSRG	California Hatchery Scientific Review Group
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CTS	California Tiger Salamander
CVFPB	Central Valley Flood Protection Board
CVP	Central Valley Project
CWA	Clean Water Act
CWT	coded wire tag
Delta	Sacramento-San Joaquin Delta
DMI	deep matrix incubator
DGS	Department of General Services
DOF	Department of Finance
DWR	California Department of Water Resources
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
ESA	(Federal) Endangered Species Act
FMP	Fisheries Management Plan
FMP	SJRRP Fisheries Management Plan
FMWG	Fisheries Management Work Group
FRH	Feather River Hatchery
FRRT	Fisheries Reintroduction Regulatory Team
FY	Fiscal Year
FWUA	Friant Water Users Authority now Friant Water Authority
HCT	Hatchery Coordination Team

HFB	Hills Ferry Barrier
HGMP	Hatchery and Genetic Management Plan
Interim Facility	Interim Salmon Conservation and Research Facility
ITP	Incidental Take Permit
LED	Law Enforcement Division
LSAA	Lake and Streambed Alteration Agreement
MAP	Monitoring and Analysis Plan
MOU	Memorandum of Understanding
NMFS	National Marine Fisheries Service
NPDES	National Pollution Discharge Elimination System
NWP	Nationwide Permit
NOAA	National Oceanic and Atmospheric Administration
NRDC	Natural Resources Defense Council
OHV	Off-highway Vehicles
PIT	passive integrated transponder
PMP	Program Management Plan
RA	Restoration Administrator
Reclamation	U.S. Bureau of Reclamation
RST	Rotary Screw Trap
RWQCB	Regional Water Quality Control Board
SCARF	Salmon Conservation and Research Facility
Settlement	Stipulation of Settlement in <i>NRDC, et al., v. Kirk Rodgers, et al.</i>
SIG	Small Interdisciplinary Group
SIRF	Satellite Incubation and Rearing Facility
SLC	(California) State Lands Commission
SJH	San Joaquin State Trout Hatchery
SJRRP or Program	San Joaquin River Restoration Program
TAC	Technical Advisory Committee
USFWS	U.S. Fish and Wildlife Service



# **1 INTRODUCTION**

This report summarizes fiscal-year actions taken from July 2014 to June 2015 by the California Department of Fish and Wildlife (CDFW) in collaboration with the San Joaquin River Restoration Program (SJRRP or Program) participants. The report also provides the background setting driving all SJRRP actions towards meeting the Restoration and Water Management goals outlined in the Stipulation of Settlement (Settlement) and the Memorandum of Understanding (MOU) between the State and the Settling Parties.

## **1.1 San Joaquin River Settlement**

In 1988, a coalition of environmental groups led by the Natural Resources Defense Council (NRDC) filed a lawsuit challenging the renewal of long-term water service contracts between the United States and Friant Division contractors of the Central Valley Project (CVP) Friant Division contractors. After more than 18 years of litigation of this lawsuit, known as *NRDC, et al., v. Kirk Rodgers, et al.*, a Stipulation of Settlement (Settlement) was reached. On September 13, 2006, the Settling Parties reached agreement on the terms and conditions of the Settlement, which was subsequently approved by the Court on October 23, 2006. The Settling Parties include the NRDC, Friant Water Users Authority (FWUA), and the U.S. Departments of the Interior (through the Bureau of Reclamation [Reclamation] and the Fish and Wildlife Service [USFWS]) and Commerce (through the National Marine Fisheries Service [NMFS]).

### **1.1.1 Settlement Goals**

The Settlement identifies two primary goals:

- Restoration Goal – 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
- Water Management Goal – 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

### **1.1.2 Memorandum of Understanding with the State**

The Settling Parties agreed that implementing the Settlement will require participation of the State of California. Therefore, concurrent with the execution of the Settlement, the Settling Parties entered into a MOU with the State of California—by and through the California Natural Resources Agency, the California Department of Water Resources (DWR), CDFW, and the California Environmental Protection Agency—on September 13, 2006.

Consistent with the MOU, the State plays a major, collaborative role in the planning, design, funding, and implementation of the actions called for in the Settlement. The

State Agencies assist the Settling Parties in implementing the Settlement consistent with the State Agencies' authorities, resources, and broader regional natural resource management strategies.

Under the MOU, CDFW and DWR further pledge to assist the Settling Parties in identifying State funding sources that may be available to implement the Restoration and Water Management goals, the level of State funding to be contributed towards specific projects required by the Settlement, and the level of funding required for extended operation of the Hills Ferry Fish Barrier (HFB). The terms of this MOU terminate on December 31, 2026, unless extended by written agreement of all of the Parties.

## **1.2 Program Organization**

The Settlement states that the Secretary of the Interior will implement the terms and conditions of the Settlement. The Implementing Agencies responsible for implementing the Settlement and managing the Program include Reclamation, USFWS, NMFS, DWR, and CDFW.

Court approval of the Settlement initiated a series of actions resulting in a Program structure that provides for effective oversight, management and transparency of Program implementation. Key to management and oversight of Settlement implementation are several working groups that meet regularly, develop products, and implement actions that further the Restoration and Water Management goals.

### **1.2.1 San Joaquin River Restoration Program Team**

The SJRRP Team is a multi-tiered group that includes staff from the Implementing Agencies. Organizational roles and responsibilities of this group are as follows:

Program Management Team – Includes leadership from the Implementing Agencies and is responsible for the overall direction and coordination of the SJRRP and consistency with respective agency policies and programs

Technical Working Groups - The SJRRP features several Technical Work Groups, each supported by various subject-matter specific sub-groups

### **1.2.2 Restoration Administrator and Technical Advisory Committee**

The Settlement specifies the roles and responsibilities for a Restoration Administrator (RA), who is supported by a Technical Advisory Committee (TAC). The structure of the TAC is intended to provide for timely input on technical issues related to the Restoration and Water Management goals.

Restoration Administrator – The RA is selected jointly by the NRDC and FWUA, and in consultation with the TAC, provides recommendations to the Secretary of the Interior regarding specific elements of the Settlement and certain issues related to the Program's Restoration and Water Management goals;

Technical Advisory Committee – The TAC features six voting members selected by and representing FWUA and NRDC. Voting members of the TAC assist and advise the RA regarding areas outlined in the Settlement, have relevant technical or scientific background or expertise in fields related to river restoration or fishery restoration, and serve for three-year terms. There are two nonvoting members of the TAC representing the State (from DWR and CDFW) and three Federal agency liaisons (from Reclamation, NFMS, and the USFWS) to ensure coordination and information-sharing with the Implementing Agencies.

### **1.2.3 Third Party Stakeholders**

Third parties represent some of the entities or individuals located in the San Joaquin River Basin that are not directly involved in the Settlement but could be affected by its implementation. These include landowners adjacent to the San Joaquin River and Eastside Bypass, water rights holders on downstream tributaries to the San Joaquin River, and other CVP water users that rely on water conveyed from the Sacramento-San Joaquin Delta.

## **1.3 Program Coordination**

CDFW coordination and support for implementation of the SJRRP began in 2006 and continues under a growing Program that has required increased staffing resources. Activities pursued by CDFW staff include participation in multiple Program technical and management work groups (Table 1), implementation of restoration and reintroduction actions, research and monitoring, regulatory actions, and project planning oversight. The ambitious nature of Program implementation requires regular meetings with the Implementing Agencies, Settling Parties, and stakeholder groups. While new work teams frequently form to manage near term projects and evolving issues, some are also consolidated over time to better manage resources. There are a number of core teams that meet on a regular basis and some that meet less frequently.

## **1.4 CDFW Staffing**

For FY 2014/2015, CDFW dedicated staff involved in the SJRRP consisted of several full-time and part-time positions, including:

### **Full-Time (9):**

- One (1) Environmental Program Manager
- One (1) Senior Environmental Scientist Supervisor
- One (1) Senior Environmental Scientist (Specialist)
- Five (5) Environmental Scientists
- One (1) Associate Government Program Analyst

**Part-Time (9):**

One (1) Office Technician

Eight (8) Scientific or Seasonal Aides

CDFW also provided support to the SJRRP through numerous non-dedicated administrative, technical, regulatory, legal, and management staff. Additional support was provided by two volunteer assistants under the Americorps Watershed Stewards Project of the California Conservation Corps, who worked closely with and received mentorship from CDFW staff while serving with the San Joaquin River Partnership.

**Table 1: CDFW staff participated in the following core groups during Fiscal Year (FY) 2014/2015**

<p><u>Management and Oversight</u></p> <ul style="list-style-type: none"><li>• Program Management Team</li><li>• Technical Advisory Committee</li><li>• Settling Party Consultation Team</li><li>• Agency Policy Team</li><li>• Monitoring and Analysis Plan Oversight Panel</li><li>• Public Affairs Team</li></ul>	<p><u>Regulatory and Permitting Teams</u></p> <ul style="list-style-type: none"><li>• Environmental Compliance and Permitting Workgroup</li><li>• Fisheries Reintroduction Regulatory Team</li><li>• Endangered Species Act Group</li><li>• NFMS Spring-run Technical Memo Team</li></ul>
<p><u>Technical Teams</u></p> <ul style="list-style-type: none"><li>• Fisheries Management Work Group</li><li>• Reach 2B Coordination Team</li><li>• Reach 4B Coordination Team</li><li>• Flow Scheduling Subgroup</li><li>• Small Interdisciplinary Groups<ul style="list-style-type: none"><li>○ Spawning and Incubation Habitat</li><li>○ Juvenile Rearing Habitat</li><li>○ Predation Protection</li><li>○ Adult Migration</li></ul></li><li>• Spring-Run Management and Monitoring Team</li><li>• Fisheries Monitoring Subgroup</li><li>• Restoration Goal Technical Feedback Group</li></ul>	<p><u>Hatchery Related Teams</u></p> <ul style="list-style-type: none"><li>• SCARF Coordination Team</li><li>• SCARF Construction Planning Team</li><li>• Genetics Subgroup</li><li>• Conservation Facility Subgroup</li></ul>

## 1.5 Project Area

The geographic area for the SJRRP includes California's Central Valley from the Sacramento-San Joaquin Delta (Delta) to the base of the Tehachapi Mountains south of Bakersfield. This area includes the San Joaquin River from Friant Dam to the Delta, the Friant Division of the CVP, other water service areas potentially affected by changes in water deliveries or restoration of the San Joaquin River, and tributaries to the San Joaquin River downstream of the Restoration Area.

The Restoration Area is 153 miles long, from Friant Dam downstream to the confluence with the Merced River. This stretch of river crosses the counties of Fresno, Madera and Merced. For the purposes of the Program, the Restoration Area has been divided into five primary reaches (Figure 1). The Program is also evaluating sections of the Eastside and Mariposa flood bypasses as potential alternatives to the river for carrying Restoration Flows and fish routing.

The five designated reaches in the Restoration Area include:

- **Reach 1** – Friant Dam to Gravelly Ford. This reach is further divided into sub-Reaches 1A and 1B with Highway 99 crossing serving as the dividing line.
- **Reach 2** – Gravelly Ford to Mendota Dam. This reach is further divided into sub-reaches 2A and 2B with the Chowchilla Bypass control structure serving as the dividing line.
- **Reach 3** – Mendota Dam to Sack Dam.
- **Reach 4** – Sack Dam to the confluence of Bear Creek and the Eastside Bypass. This reach is further divided into sub-Reaches 4A and 4B with the Sand Slough control structure serving as the dividing line.
- **Reach 5** – Eastside Bypass/Bear Creek confluence to the Merced River confluence.

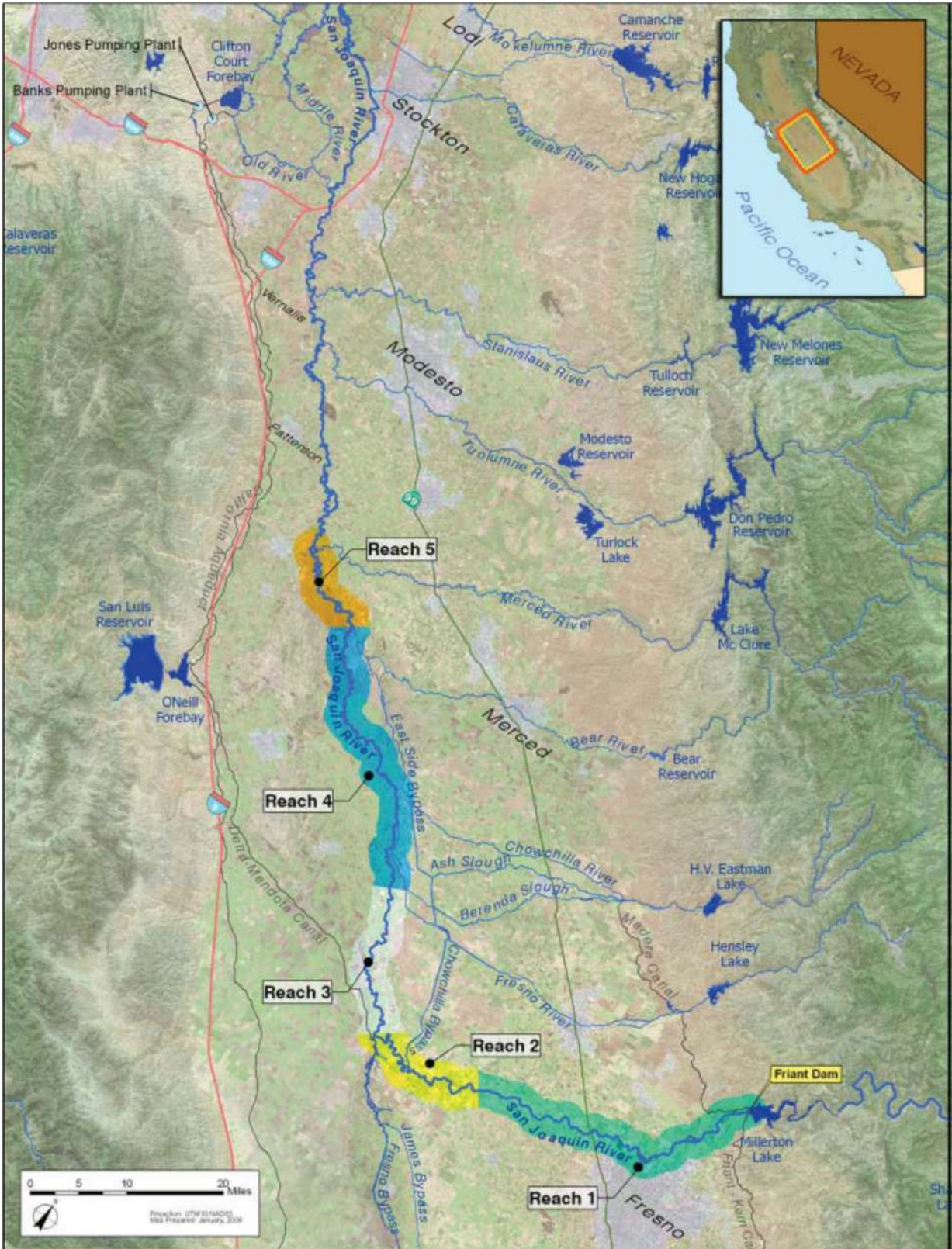


Figure 1: San Joaquin River (Source: San Joaquin River Restoration Program, 2007 Annual Report)

## 1.6 Program Schedule and Milestones

The proposed actions in the Settlement outline how the implementing agencies will achieve the Restoration and Water Management goals. As part of the Settlement, the Settling Parties developed a staged timeline for developing and implementing Program improvements. The following information highlights significant milestones in the three stages of SJRRP implementation as well as a revised schedule to achieve the goals of the Settlement.

### 1.6.1 Implementation Staging

The SJRRP developed a three-stage implementation strategy in the Program Management Plan (SJRRP 2007) representing significant implementation milestones consistent with Settlement.

Stage 1 - Stage 1 focuses on program-level planning and environmental review, including formulating and evaluating reasonable alternatives for accomplishing the Restoration and Water Management Goals with a focus on implementing system-wide aspects. Stage 1 was initiated and included developing environmental and planning documents and identifying the significant data needs required to complete Stage 2.

Stage 2 - Stage 2 commenced in October 2009 with the release of Interim Flows and would have concluded in December 2013 with the completion of Phase 1 improvements and agreement on operational guidelines. During Stage 2, an Interim Flows program was implemented to support relevant data collection concerning flows, temperatures, fish needs, seepage losses, recirculation, recapture, and reuse. Stage 2 also includes reintroducing spring-run and fall-run Chinook salmon (*Oncorhynchus tshawytscha*) and implementing all Phase 1 channel improvements. Phase 1 channel improvements include:

- Creating a bypass channel around Mendota Pool to convey at least 4,500 cubic feet per second (cfs);
- Modifying Reach 2B in order to convey at least 4,500 cfs;
- Modifying Reach 4B in order to convey at least 475 cfs;
- Modifying the Sand Slough control structure to ensure fish passage;
- Screening the Arroyo Canal diversion to prevent anadromous fish entrainment;
- Modifying Sack Dam to ensure fish passage;
- Modifying structures in the Eastside and Mariposa Bypass channels to provide anadromous fish passage on an interim basis until completion of Phase 2 improvements;
- Constructing, if needed, low-flow channels in the Eastside and Mariposa Bypass channels suitable to support anadromous fish migration; and



- Constructing seasonal barriers in the area of Mud and Salt Sloughs to prevent adult anadromous fish from entering these false migration pathways.

**Stage 3** - The primary activities in Stage 3 include the release of full Restoration Flows from Friant Dam, continued implementation of the Fisheries Management Plan, construction of the remaining Program features that were not a Phase 1 priority, and operation and maintenance of project facilities. The full Restoration Flows were to commence no later than January 1, 2014.

### 1.6.2 Framework for Implementation

Realizing that SJRRP implementation was unavoidably behind schedule, a *Third Party Working Draft Framework for Implementation*, dated June 19, 2012 (“Framework”; SJRRP 2012), was developed by the SJRRP to establish a realistic schedule for implementation based upon the best available technical, biological, schedule, and funding information. The Framework has been treated as a living document with initiation of a Revised Framework in 2014 to update and refine the schedule and associated future funding needs. The Framework process will continue to be updated as additional information is gained and milestones are reached, focusing on activities necessary to plan, permit, design, and construct major physical project elements of the SJRRP.

Key elements of the revised schedule seek to sequentially implement actions that provide clear, realistic, and accomplishable steps towards meeting the Restoration and Water Management goals. The proposed schedule is provided in Table 2.

**Table 2: Schedule of Key Construction Actions**

2015-2019	2020-2024	2025-2029	2030+
Goal: 1,300 cfs Capacity in all Reaches	Goal: Increased Capacity	Goal: Phase 1 Projects Complete	Goal: All Remaining Projects
<ul style="list-style-type: none"> <li>• Friant-Kern Capacity Restoration</li> <li>• Madera Canal Capacity Restoration</li> <li>• Mendota Pool Bypass</li> <li>• Temporary Arroyo Canal Screen and Sack Dam Passage</li> <li>• SCARF Completion</li> <li>• Seepage Projects to 1,300 cfs</li> </ul>	<ul style="list-style-type: none"> <li>• Financial Assistance for Groundwater Banks</li> <li>• Reach 2B</li> <li>• Arroyo Canal and Sack Dam</li> <li>• Reach 4B Land Acquisition</li> <li>• Seepage Projects to 2,500 cfs</li> <li>• Levee Stability to 2,500 cfs</li> </ul>	<ul style="list-style-type: none"> <li>• Reach 4B</li> <li>• Salt and Mud Sloughs</li> <li>• Chowchilla Bifurcation Structure Modifications</li> <li>• Highest Priority Gravel Pits</li> <li>• Seepage Projects to 4,500 cfs</li> <li>• Levee Stability to 4,500 cfs</li> </ul>	<ul style="list-style-type: none"> <li>• Ongoing Operations and Maintenance</li> </ul>



## 1.7 CDFW Program Objectives

Key objectives for CDFW support and assistance with implementation of the Settlement include the following:

- Support the Settling Parties in achieving the SJRRP Restoration Goal, consistent with CDFW's authorities, resources, and broader regional resource strategies.
- Fulfill the other commitments identified in the State Agency MOU pertaining to the Settlement.
- Produce a spring-run Chinook salmon stock on the San Joaquin River that is genetically diverse, while minimizing impacts to source populations.
- Provide a controlled laboratory environment for conducting fish research.
- Manage Chinook salmon runs in the Restoration Area and, specifically, the potential for hybridization between runs.
- Monitor and conduct research that will direct Chinook salmon management within the Restoration Area.
- Fulfill CDFW's mission to manage California's diverse fish, wildlife, and plant resources, and the habitats on which they depend, for their ecological values and for their use and enjoyment by the public.
- Fulfill CDFW's obligation to conserve, protect, and manage fish, wildlife, native plants, and habitats necessary for biologically sustainable populations of those species and as a trustee agency for fish and wildlife resources pursuant to Fish and Game Code section 1802.

## 2 SALMON REINTRODUCTION

As part of the planning process for implementing the Settlement, the Implementing Agencies created a SJRRP Fisheries Management Plan (FMP) (SJRRP 2010a). This document laid out an approach to adaptively manage the reintroduction of Chinook salmon to the San Joaquin River, a key element to the Restoration Goal. The FMP also identified specific fish population and habitat goals to guide the vision of the SJRRP and measurable objectives to evaluate program success.

Fisheries Management Plan (SJRRP 2010a) Population Goals include:

- Establishing natural populations of spring and fall-run that are specifically adapted to San Joaquin River conditions;
- Establishing populations of spring and fall-run that are genetically diverse;
- Establishing populations of spring and fall-run that are demographically diverse;
- Minimizing hybridization between runs and hatchery stocks; and
- Establishing a fish community that would be expected in the Sacramento-San Joaquin Province.

Due largely to the presence of fall-run populations in nearby tributaries to the San Joaquin River, the FMP recommended a volitional recolonization strategy as described by the TAC and RA (TAC 2007). However, to ensure that the reintroduced spring-run Chinook salmon population is genetically diverse, the FMP recommended full implementation of conservation practices via artificial propagation of Chinook salmon. CDFW proposed the Salmon Conservation and Research Facility (SCARF), a conservation-style hatchery which will produce Chinook salmon for reintroduction to the San Joaquin River and also serve as a research facility for studies related to Chinook salmon in the Restoration Area. The SCARF would provide CDFW with the ability to produce adult broodstock from small numbers of eggs and juveniles collected from various donor populations in order to produce a genetically diverse population in the San Joaquin River while minimizing impacts to source populations.

The Hatchery and Genetics Management Plan (HGMP) for the San Joaquin River Salmon Conservation and Research Program adopts the population goals from the FMP and establishes two additional genetics goals (SJRRP 2010b):

- Promote and protect genetic diversity within the reestablishing populations while safeguarding against negative genetic effects to out-of-basin source and nontarget populations; and
- Reestablish self-sustaining San Joaquin River spring- and fall-run salmon populations.

## 2.1 Hatchery Scientific Review

A California Hatchery Scientific Review Project was initiated 2010 to address an identified need to reform hatchery practices. The goal of this initiative is to: (1) help recover and conserve naturally spawning salmon and steelhead populations, and (2) support sustainable fisheries with little or no deleterious consequence to natural populations. A California Hatchery Scientific Review Group (California HSRG) was appointed to weigh available scientific information so as to produce consensus recommendations for changes in hatchery practices which should provide guidance to policy makers who will be responsible for implementing changes in how California hatcheries are operated. The California HSRG reported its findings and recommendations in the California Hatchery Review Report (California HSRG 2012).

To evaluate and implement recommendations in the California Hatchery Review Report, CDFW and USFWS began facilitating coordination of a Hatchery Policy Team and Hatchery Coordination Teams (HCTs). Though not identified in the California Hatchery Review Report (owing to the fact that a hatchery has yet to be developed for the SJRRP), an HCT for the SCARF was formed in 2013.

The role of the HCT is to evaluate and prioritize recommendations in the California Hatchery Review Report for implementation that have the biggest impact, taking into consideration relevance, feasibility, costs and technical considerations.

Specific tasks of the HCT include:

- Reviewing and evaluating statewide standards and hatchery-specific recommendations;
- Reviewing program reports (Appendix VIII of the California Hatchery Review Report) for accuracy;
- Prioritizing hatchery-specific recommendations for implementation;
- Providing recommendations on hatchery improvements to the Hatchery Policy Team;
- Identifying and categorizing recommendations into those that should be accomplished within one year, within one to five years, and greater than five years;
- Developing an implementation plan including timelines, responsibilities and annual reviews to ensure successful implementation; and
- Providing an implementation plan to the Hatchery Policy Team.

The third meeting of the SCARF HCT was held in June 2015. The team continued to develop an HCT Charter and Purpose Statement for the SCARF, evaluated membership, shared planning and technical documents, and provided updates on ongoing activities at the Interim Facility and progress in development of the SCARF. A liaison from the SCARF HCT also participated in Hatchery Policy Team and Central Valley Team meetings.

## 2.2 Interim Salmon Conservation and Research Facility Operations

A pilot-scale Interim Salmon Conservation and Research Facility (Interim Facility) has been in operation since 2010 to provide experience and training for rearing Chinook salmon through adulthood and provide a surrogate facility while the SCARF is being constructed. The facility is guided by multi-agency technical teams that provide direction for operation to ensure consistency with Program goals and objectives and compliance with various regulatory and guidance documents. Roles and products of the technical teams are provided in Table 3, below.

**Table 3: Interim Facility/SCARF Operations Coordination Teams and Work Groups**

<b>Tech Team or Workgroup</b>	<b>Role(s)</b>	<b>Documents Prepared or Used for Guidance</b>
Hatchery Coordination Team (HCT)	Ensures facility operations are consistent with HSRG recommendations and with the facility's HGMP	Program's Draft Hatchery and Genetic Management Plan (HGMP; SJRRP 2010)
Fisheries Management Workgroup (FMWG)	Ensures facility operations are consistent with Program goals and objectives	Donor Stock Collection Plan
Conservation Facility Subgroup	A subgroup of the FMWG; develops a broodstock collection plan for the FMWG Donor Stock, Collection Plan	Conservation Facility Broodstock Collection Recommendations
Genetics Subgroup	Reviews proposed donor stock collections and makes recommendations to ensure population genetic diversity	Contributes to development of, and ensures consistency with, the Program's HGMP

Each year, the SJRRP must prepare a Donor Stock Collection Plan and Annual Report pursuant to the NMFS 10(a)(1)(A) permits 17781 and 14868. Included in the Donor Stock Collection Plan are broodstock collection recommendations developed by the Program's Conservation Facility Subgroup. The subgroup considers Interim Facility and SCARF capacity limitations, coordinates with the Genetics Subgroup and HCT, and makes recommendations to the Fisheries Management Workgroup (FMWG) to include in its donor stock collection planning process. The 2015 Conservation Facility Subgroup recommendations were completed in cooperation with Conservation Facility Subgroup, the Genetics Subgroup, the FMWG, and the facility's HCT. The 2015 Recommendations include both the collection of the BY 2015 broodstock from Feather River Hatchery (FRH) and the spawning of the BY 2012 broodstock that are currently held at the Interim Facility. The 2015 recommendations also prescribed mating protocols to use up to a 2:1 male to female spawning ratio for spawning the BY 2012 adults at the Interim Facility in order to increase genetic diversity, as well as allowing up to 20 percent early maturing two-year-old males in crosses, depending on final recommendations of the Genetic Subgroup.

### **2.2.1 Genetics Subgroup**

The Genetics Subgroup is composed of State and Federal personnel who specialize in fish genetics management. The group meets as needed to discuss fish genetics topics for the Program.

The Genetics Subgroup met in December 2014 to discuss the following topics:

- The NMFS Southwest Fisheries Science Center's recommendation to modify the mating techniques at the Interim Facility during future spawning seasons to include a 2:1 male to female ratio during spawning in effort to increase genetic diversity;
- Guidelines for developing criteria thresholds for introgression between fall- and spring-run when both are present in the river;
- The number of crosses needed at FRH if the Program takes 2760 eggs for broodstock in 2015; and
- Review and discussion of the 2015 Conservation Facility Subgroup Recommendations.

### **2.2.2 Broodstock Collections**

Since 2012, the Program has collected 560 eggs annually for broodstock from FRH in order to meet the fish production goal of spawning 50-100 adult pairs each year at the Interim Facility. In 2015, the plan is to collect 2760 eggs in anticipation of the completion of the full-scale SCARF in late 2017, which will accommodate the spawning of up to 450 adult pairs each year. Until the SCARF becomes operational, the Interim Facility Program will continue to be used as a surrogate facility for fish production. Therefore, the final number of eggs collected will be based on the projected holding requirements of this group, which increases with time based on the projected holding capacity of the Interim Facility as shown previously in Table 3.

Throughout the 2014 spawning period, FRH staff or their designated agents segregated eggs from a total of up to 105 crosses, which were 15 more than the 2012 and 2013 collections. This allowed for the rejection of up to 55 crosses while providing the minimum of 50 crosses for sufficient genetic diversity. In previous years, parents selected for these crosses were to have clipped adipose fins (i.e., coded wire tag [CWT] present) and to be comprised of 2 percent or less two year-old fish (males and females, as estimated by length data and later confirmed by CWT data). This year, however, the Conservation Subgroup recommended allowing parents with an adipose fin present (i.e., naturally produced) to encourage natural origin traits in the broodstock population.

Data collection for crosses included: Hallprint tag number, Hallprint tagging date, adipose fin status, head tag number, CWT number, gender, fork length, ovarian fluid sample number, volume of flaccid eggs per female, number of eggs per cross, tissue sample number and corresponding genetic analysis data. Based on the results of these analyses, Program staff selected 560 eyed eggs for broodstock. Following a 5

month quarantine period at Silverado Fisheries Base (SFB), juveniles from the collection were transferred to the Interim Facility using NMFS-approved transportation protocol. At the Interim Facility, juveniles were tagged with passive integrated transponder (PIT) tags and tissue was sampled for sex identification and family relatedness analysis. These brood year (BY) 2014 broodstock will be reared until spawned in the fall of 2017, and their progeny will be released to the Restoration Area in the spring of 2018.

### **2.2.3 Broodstock Management**

During FY 2014/2015, staff continued to rear BY 2012 and 2013 spring-run Chinook salmon broodstock. In September 2014, staff segregated BY 2014 eggs at FRH. These were transferred in October to the Silverado Fisheries Base for quarantine and implanted with CWTs identifying them as SJRRP fish. Once they were tagged and held for approximately one week to ensure post-tag recovery, they were transported to the Interim Facility in late March 2015.

Regular duties at the Interim Facility during FY 2014/2015 included:

- Daily temperature and dissolved oxygen monitoring;
- Growth modulation to prevent early maturation through targeted feeding schedules;
- Monthly inventory and activity reports to NMFS;
- Quarterly reporting of water quality analysis of influent and effluent;
- Quarterly invasive species monitoring and reporting; and
- Regular weight and length data collections for growth monitoring.

Other significant activities during the period included:

- Collection of the BY 2014 broodstock from FRH;
- Transfer of the BY 2014 eyed broodstock eggs from FRH to Silverado Fisheries Base for quarantine and coded wire tagging;
- Coordination with the CDFW Fish Health Lab for fish health assessments, disease monitoring, and fish transfer approvals;
- Coordination with Tissue Archive Lab and NMFS Southwest Fisheries Science Center for genetic tissue processing and analysis;
- Development of various contracts for facility operation; and
- Commencement of the San Joaquin HCT.

Of major concern for hatchery managers is the ability to control early maturation of broodstock. Early maturation, occurring predominantly in males, has the potential to reduce the genetic diversity of the broodstock population. These “precocious” fish typically die shortly after maturation and may not be available, or desirable, for spawning. Thus, the number of individuals available for spawning becomes reduced, as do the alleles they would otherwise have contributed to the population, so genetic diversity is diminished. Several factors may trigger early maturation in Chinook

salmon, including genetics, emergence timing, energy stores, and size and/or growth rate at specific times of year (Larsen et al. 2013). Much of the work done at the Interim Facility pertains to controlling early maturation.

### **2012 Brood Year**

Program staff continued to rear at the Interim Facility the BY 2012 broodstock, which were collected as eggs in September of 2012 at FRH. This brood year was the first group of spring-run Chinook salmon broodstock collected for the Program.

In August 2014, BY 2012 broodstock were weighed and examined for precocity using ultrasound to identify the degree of gonadal maturation. No females had matured, in contrast to the 10% maturation of two-year-old females that were observed with experimental BY 2010 fall-run broodstock during fall of 2012.

The August precocity check also revealed a reduced maturation rate in the BY 2012 males. The percentage of precocious males was 31% compared to 84% of similar age BY 2010 fall-run males. This is in contrast to the previous year, when as yearlings, the BY 2012 spring-run males exhibited over double (33%) the precocity of the BY 2010 fall-run yearling males (15%). Some of the precocious males (N=16) had matured for a second time (first as yearlings) and were found to have a high condition factor (weight/length measure of fish health) of 1.76 as compared to the males (N=37) that had matured for the first time in year-two who had a condition factor of 1.56.

Also noteworthy is that, by August 2014, male precocity was reduced without an accompanying reduction in total weight. Both the mature (462g) and immature BY 2012 males (366g) were as large as or larger than the corresponding BY 2010 fall-run males (373g and 322g). The larger size was achieved by accelerating growth rates from May to August, a period which is outside the maturation decision window. This finding appears to validate that maturation is triggered by factors associated with growth rate and condition factor during particular periods of development and not solely determined by total body mass at the time of spawning. We attribute the success in the reduction in male precocity to the modulation of growth rates during critical maturation decision windows by using adjustments in feed rates and, when possible, temperature. This is indicated by the low weight and condition factor of the fish at the end of January as compared to their weight and condition factor at the beginning of the spawning period (Figure 2).

In April 2015, BY 2012 broodstock were weighed and examined for precocity using ultrasound to identify the degree of gonadal maturation. No gametes were observed to be maturing. The examination was repeated in June 2015, and 43 of 100 females were identified as maturing and 36 of 105 males were identified as maturing. Eggs of these three-year old individuals were measured to average 2.8 mm compared to fully mature Chinook eggs that are typically 6-9 mm. The ability to identify potential spawners this early using ultrasound has significance because maturing males and females were clearly identifiable four months prior to spawning, allowing the Program the option to identify maturing adults for release to the SJR for holding and spawning studies, which are slated for spring of 2016.



Figure 2: First-time mature (left) and twice mature (right) precocious males at age-2

### 2013 Brood Year

The BY 2013 broodstock continued to be reared at the Interim Facility. Beginning in July 2014, the males were fed at a progressively lower feed rate in effort to prevent early maturation so that by the end of August they received a 25% feed ration. The ration was reduced during the “early maturation decision window,” which reportedly begins in September and lasts through January (Larsen et al. 2014). Early sexual maturity has been predominantly a concern for male captive broodstock. The female ration was progressively increased from 110% to a 160% feed ration in an effort to maximize growth rates. However, as the year progressed, females were also fed a reduced feed ration due to heat stress concerns associated with the higher temperatures that were experienced in association with the ongoing drought.

In August 2014, the BY 2013 broodstock were weighed and measured and the number of precocious males were identified based on secondary sexual characteristics (i.e. darkened skin and a deepened girth) and ultrasonography of the testes. Only 7% of the males were identified as precocious, which is just 1/5<sup>th</sup> of the 34% that were observed the previous year. The reduced maturation rate was attributed to a more aggressive reduction in growth rates during the maturation decision window, achieved at Silverado Fisheries Base by reducing the feed ration to 35% and lower water temperatures during egg incubation and early rearing.

The physiological decision to initiate maturation occurs 8-12 months prior to spawning (Larsen et al. 2004, Shearer et al. 2006). Therefore, the decision to mature as yearlings occurs shortly after swim up, placing the Program’s broodstock at the Silverado Fisheries Base during the decision window (periods of the year when sexual maturity may be triggered early by certain “environmental” factors). A growth modulation approach has been reported to be effective in reducing early male maturation by feeding fish a reduced ration to restrict growth during maturation decision windows (Larsen et al. 2013).

During the spring of 2015, a feeding trial study was conducted in an attempt to more narrowly define these decision windows. Having the ability to do so would enable hatchery managers to delay feeding restrictions and start them back on regular feeding regimens sooner to maximize fish growth and, therefore, gamete (i.e., eggs, sperm) production. Beginning in September 2014, the male BY 2013 juveniles (a



total of 182 fish) were fed a feed ration of 25% of the normal rate. At the end of January, the male tank was separated into three individual 6-ft tanks. The first group was fed the reduced ration until the beginning of April, at which point the ration was increased over the month until a 100% feed rate was reached by the beginning of May. The second group was fed a reduced ration until the beginning of March, and a third group was fed a reduced ration until the beginning of February. Each group was weighed and measured monthly. Once each group reached a 100% feed rate, they were recombined with the BY 2013 females. In August, 2015, each male will be inspected for early maturation, and effect of the timing of increased feed rates on precocity will be determined.

### **2014 Brood Year**

A total of 560 spring-run Chinook salmon eggs were collected in September 2014 at FRH. The collection process began by ensuring selected eggs were from spring-run parents. Spring-run adults returning to the hatchery are identified by the presence of a Hallprint® tag. FRH staff trap and tag adult Chinook that migrate up during the spring and hold over the summer in pools just below the hatchery. Fall-run Chinook that migrate in the fall don't receive these Hallprint® tags, enabling differentiation of the two runs for selection purposes. Adult spring-run Chinook salmon for broodstock were spawned on September 19, 23, and 25.

A total of 105 crosses from FRH stocks were segregated for the Program. The number of crosses segregated per day increased from 30 crosses in previous years to 35 crosses in an effort to increase genetic diversity. Each female was spawned with one male and the eggs from each cross were placed in individual incubation trays. Data collected from the adults included; Hallprint® tag number, fish length, the presence or absence of the adipose fin, and fecundity. Tissue samples were collected for genetic analysis and heads were collected for CWT analysis.

Eggs from the crosses remained at FRH through the eyed stage while ovarian fluid and kidney samples taken from the parents were analyzed for pathogens and CWTs were read to verify the spawned adults themselves had spring-run parentage. In October, 560 individual broodstock eggs were selected and transferred to Silverado Fisheries base for quarantine, fish health assessment, and tagging. The CDFW Fish Health Lab conducted a health inspection on 60 of the juveniles in February. In March, the fish were implanted with CWTs, their adipose fins were clipped, and they were transferred to the Interim Facility for rearing. Once at the Interim Facility, fish were tissue sampled for genotyping and sex identification and then PIT tagged. The PIT tag number and corresponding fish data were recorded in a Microsoft Access database. Tissue samples were collected according to accepted protocols and transferred to the CDFW Tissue Archive in Sacramento for processing and storage. Samples were then sent from the Tissue Archive to NMFS Southwest Fisheries Science Center for genetic analysis and sex identification. Results of the analysis were used to segregate fish by sex in an effort to reduce the precocity rate of males through growth modulation. Genetic analysis is conducted pursuant to a genetics contract between Reclamation and NMFS.

### **2.3 Salmon Conservation and Research Facility (SCARF)**

Federal funding for SCARF/Interim Facility operations began in FY 2012/2013 and is currently planned to continue through FY 2021/2022. Memorializing Reclamation's commitment and CDFW's obligations regarding Interim Facility and SCARF operations, both parties cosigned an Operations and Maintenance Agreement (O&M Agreement) to ensure objectives of the Interim Facility and SCARF were in line with the Fisheries Management Plan (FMP) (SJRRP 2010a). These objectives are described below.

1. The development and maintenance of a genetically diverse broodstock of spring and potentially fall-run Chinook to support the restoration of Chinook salmon to self-sustaining levels per the Settlement and Act and in accordance with applicable Program guidance.
2. Production of juvenile spring-, and fall-run Chinook, with an emphasis on spring-run Chinook production, to support the restoration of Chinook salmon runs to self-sustaining levels per the Settlement and Act and in accordance with applicable Program guidance.
3. Achieve production targets set by the SJRRP to the maximum extent practicable given the limitations of tank space and water supply at the Interim Facility, until the full-scale Conservation Facility becomes operational.
4. Support and provide research needs associated with restoring spring- and/or fall-run Chinook populations to self-sustaining levels per the Settlement and Act and in accordance with applicable Program guidance.

In support of these objectives, CDFW will develop and maintain broodstock of satisfactory quality and quantity to support reintroduction of spring-run Chinook salmon for the SJRRP Restoration Goal, in accordance with an HGMP and other applicable program guidance and within the operational limitations of the facility. Under the O&M Agreement CDFW is currently rearing BYs 2012, 2013, and 2014 spring-run Chinook salmon from FRH, and will begin rearing BY 2015 juveniles in spring of 2016.

Production of spring-run Chinook at the Interim Facility and SCARF will be consistent with recommendations by the SJRRP Conservation Subgroup, the HSRG, and HCT, which include members from Reclamation, the FWS, NMFS, DWR, CDFW, and their contractors. CDFW will be limited in production capabilities until the full-scale Conservation Facility is operational. However CDFW staff have estimated production capabilities of the Interim Facility based on tank space, water availability and fish needs, and determined it will be able to meet Program needs through 2017. These production estimates are provided in Table 4.

**Table 4: Schedule and Numbers of Broodstock Collection and Juvenile Releases**

Brood Year of Collected Donor Stock	Offspring Release Year	Target Number of Juveniles Released	Number of Adults Needed for Production <sup>1</sup>	Estimated Female Fecundity	Estimated Survival from Juvenile to Adult	Estimated Survival from Egg to Juvenile	Number of Eggs Needed To Collect as Broodstock to Produce Necessary Number of Adults
2012	2016	120,000	240 (60 females)	2,500 eggs/female	0.8 survival	0.8 survival	375 (plus 60 for Pathology) = <b>435</b>
2013	2017	151,875	304 (76 females)	2,500 eggs/female	0.8 survival	0.8 survival	475 (plus 60 for Pathology) = <b>535</b>
2014	2018	200,000	400 (100 females)	2,500 eggs/female	0.8 survival	0.8 survival	625 (plus 60 for Pathology) = <b>685</b>
2015	2019	600,000	1200 (300 females)	2,500 eggs/female	0.8 survival	0.8 survival	1,875 (plus 60 for Pathology) = <b>1,935</b>
2016	2020	700,000	1400 (350 females)	2,500 eggs/female	0.8 survival	0.8 survival	2,188 (plus 60 for Pathology) = <b>2,248</b>
2017	2021	960,000	1,920 (480 females)	2,500 eggs/female	0.8 survival	0.8 survival	3,000 (plus 60 for Pathology) = <b>3,060<sup>2</sup></b>

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<sup>1</sup> Assumes 2:1 male to female ratio crosses to increase genetic diversity, and the uncertainty of sex of collected individuals but also assumes 50:50 chance of selected eggs being male or female.

<sup>2</sup> NMFS 10(a)(1)(A) Permit 14868 allows a maximum of 2760 eggs to be collected, so the number of eggs necessary for collection to produce the number of adults would need to be increased in the permit renewal, or the maximum number of eggs would be collected, but the 960,000 juveniles may not be produced for release.

Operation of the facility will be conducted to support research that furthers conservation of the Chinook salmon species in the SJRRP Restoration Area. Research activities are identified as part of the SCARF operations to be funded by the O&M Agreement. Research conducted to date includes assessing potential causes/contributors to early maturation of Chinook salmon in a hatchery setting, discussed below in Interim Facility Operations.

Staff continued pursuing the above objectives at the Interim Facility in Fiscal Year 2014/2015, and prepared and submitted a year end performance report (CDFW, 2014) in December 2014 describing how these objectives were met. The report narrative summarized donor stock selection, collection and transport, quarantine and pathology studies, transport to the Interim Facility, and monitoring and holding activities undertaken the previous year (FY 2013/2014).

## **2.4 SCARF Construction Planning and Design**

CDFW is in the process of planning and design for construction of the SCARF adjacent to the San Joaquin River near Friant, California (Figure 3). The SCARF is scheduled to be constructed by October 2017, when it will serve an important role in achieving the SJRRP spring-run Chinook salmon population objectives. The facility will produce large numbers of smolts for release from relatively small numbers of eggs and juveniles collected as broodstock from one or more donor populations, which will enable CDFW to produce a conservation stock that is genetically diverse while minimizing impacts to source populations.

The Department of General Services (DGS) is the State lead for planning and developing projects involving construction of State facilities. Prior to the beginning of Fiscal Year 2014/2015, DGS had subcontracted with HDR Engineering, with fish hatchery design expertise, to design the components and layout of the SCARF. Preliminary plans were drafted and finalized and the next phase of construction was to move into working drawings, which began in early 2015. Staff have been meeting and coordinating with DGS and HDR on refining working drawings to the 65% submittal stage. Staff have reviewed and commented on working drawings and reviewed again to ensure comments/concerns were addressed. The 100% working drawings phase of design should be complete by next fiscal year, in November or December of 2015.



Figure 3: SCARF Project Location

## 2.5 Genetics Contract

Genetic analysis for the Program is being conducted through an Inter-Agency Agreement between Reclamation and NMFS Southwest Fisheries Science Center in Santa Cruz. The contract was finalized on September 19, 2014. Samples that are approved for analysis are typically submitted through the CDFW Tissue Archive Lab for processing and are then forwarded to the Science Center for analysis. Staff coordinated with the Tissue Archive Lab and NMFS Science Center for processing tissue samples not only from spring-run Chinook salmon broodstock at the Interim Facility, but also from the 2013/2014 Trap and Haul adults and their juvenile offspring. Genetic analysis was conducted in order to complete parentage relationships between the adults and their offspring.

## 2.6 Wild Stock Selection

The SJRRP Stock Selection Strategy (SJRR 2010c) and HGMP (SJRRP 2010b) recommend the founding population in the San Joaquin River consist of spring-run Chinook salmon from Butte Creek, Mill and Deer Creeks, and both wild and hatchery stocks from the Feather River. These source populations were chosen based on genetic signature, population status, and habitat similarities to the SJRRP Restoration Area. Under this strategy, collection of donor stocks would come, over

time, from all of the identified source populations, including the potential for opportunistic collections of spring-run Chinook salmon in other watersheds (e.g., Clear and Battle creeks).

In September 2014, USFWS drafted a document outlining the information needed for the new 10(a)(1)(A) Enhancement of Species permit application. The document identified additional information needs for the new application, potential donor stocks, proposed collection numbers, collection methods, and collection criteria. Based on that document, CDFW is drafting a refined proposal for collections from natural populations. The proposal is written in coordination with USFWS and NMFS and will be reviewed internally prior to distribution. The proposed strategy will be incorporated into a new 10(a)(1)(A) permit application for broodstock collection, which will be submitted to NMFS in early 2016 for a permit term beginning in 2018. The new permit term is timed to align with the first year of operations of the full-scale SCARF.

## **2.7 Spring-run Juvenile Releases**

In 2014, USFWS was permitted by NMFS (Permit 17781) to conduct direct releases of juvenile spring-run Chinook salmon into the San Joaquin River from 2014 through 2019. These releases are intended to contribute to near-term reintroduction efforts while also providing an opportunity to fill data gaps in the Program's body of knowledge. Accordingly, approximately 54,000 juvenile spring-run Chinook salmon originating from the FRH are collected annually by USFWS and CDFW staff, acclimated to San Joaquin River water, and released via net pen into Reach 5 of the Restoration Area.

The second juvenile spring-run release took place in February 2015 when approximately 54,000 juveniles were translocated from FRH and released to Reach 5 of the Restoration Area. Additional measures were taken to ensure survival due to drought conditions, by limiting holding periods and electing to release juveniles at the lowest point possible in the Restoration Area.

### **3 RESEARCH AND MONITORING**

Research and monitoring activities are critically important to resolving uncertainties, guiding restoration actions, and ascertaining the scope and breadth of intervention necessary to achieve the Restoration Goal. These efforts seek to achieve an ecologically functional river system that will support a self-sustaining and naturally reproducing fishery. As restoration proceeds, it is necessary to monitor habitat conditions and reintroduction success and identify any actions that may be required to grow and sustain fish populations.

Without established salmon populations in the Restoration Area, a significant portion of research and monitoring is focused on assessing existing and potential future habitat conditions in the San Joaquin River. Key habitat restoration objectives, as described in the FMP (SJRRP 2010a) and supported by research and monitoring efforts, include:

- Restore flows that optimize downstream rearing and outmigration temperatures and year-round habitat connectivity throughout the Restoration Area;
- Provide flows and structural modifications to ensure adult and juvenile migration;
- Provide habitat that will support holding, rearing and outmigration under a variety of water year types;
- Reduce predation; and
- Restore habitat complexity, floodplains and riparian forests that will provide spawning and rearing habitat for native resident species during the winter and spring period.

SJRRP research and monitoring is a significant collaborative effort between the Implementing Agencies, with tasks broadly shared between the State and Federal entities. Planning documents, work products, and agency oversight are guided and developed through various technical teams, management teams and oversight panels with CDFW participation. In addition to the information provided in this section, study plans and reports are available on the Program website at:

<http://www.restoresjr.net/monitoring-data/>

#### **3.1 Adult Fall-run Chinook Salmon Trap and Haul**

Beginning in the fall of 2012, CDFW and Reclamation initiated a trap and haul program for adult fall-run Chinook salmon after a 2010 monitoring study indicated a portion of fall-run Chinook salmon evaded the Hills Ferry Barrier (HFB) and entered into Reach 5 of the Restoration Area (Portz et al. 2011). The HFB is fish migration barrier located approximately 150 yards upstream of the mouth of the Merced River

on the San Joaquin River that is intended to redirect upstream migrating adult fall-run Chinook salmon away from downstream reaches of the Restoration Area, where no suitable spawning habitat is accessible, and into the Merced River. Consequently, Chinook salmon entering Reach 5 of the Restoration Area are considered lost to the basin population as they soon encounter dewatered reaches of the Restoration Area, sinks such as Mud and Salt Sloughs, and agricultural ditches.

During FY 2015/2015, CDFW and Reclamation conducted opportunistic trapping of fall-run Chinook salmon using fyke nets in the main-stem river and Mud and Salt Sloughs and dip netting in nearby agricultural ditches (Figure 4 and Figure 5). Captured adults were measured, tagged with acoustic transmitters, and relocated to Reach 1 of the Restoration Area where they were: (1) released to the river to assess migration, spawning success, and habitat use/quality or (2) artificially spawned and incubated streamside to produce juveniles for Program studies.

During the 2014 trap and haul effort, 510 fall-run Chinook salmon (135 females and 376 males) were salvaged above the HFB. Of those, 112 females were implanted orally with acoustic tags (VEMCO V13, 69kHz transmitter) and tracked using telemetry. CDFW deployed and operated 21 stationary receivers throughout Reach 1 of the Restoration Area, which allowed staff to track migration and spawning site selection. Staff also conducted weekly mobile tracking by drift boat to establish habitat use between stationary receivers.



**Figure 4: CDFW and Reclamation staff processing captured fish near the Hills Ferry fyke net**





**Figure 5: CDFW staff dip netting fall-run Chinook salmon stranded in agricultural ditches near the main-stem San Joaquin River**

### **3.2 Streamside Spawning**

CDFW currently operates the Satellite Incubation and Rearing Facility (SIRF), a mobile spawning trailer and rearing tanks, on Reclamation property located immediately below Friant Dam. Initially conducted as a reintroduction proof-of-concept for the incubation of translocated spring-run eggs, artificial spawning of fall-run Chinook salmon captured during the Program's trap and haul efforts has occurred at the SIRF since the fall of 2012 and provides various Program studies with juvenile study fish. Eggs from the spawning portion of the trap and haul study are incubated and reared at the SIRF until juveniles reached a size suitable for tagging (e.g., CWT, adipose-clip, PIT), at which point they are held and released for various Program studies. Studies to date that have used SIRF-produced juveniles include collection weir and rotary screw trap efficiency tests, marking and tagging evaluations, and juvenile migration studies (acoustic telemetry and PIT tags).

Crosses taking place at the SIRF are spawned at a 1:1 female to male ratio. Eggs are taken from the female via the incision method (a spawning knife is used to make an incision from the genital papilla upwards to just behind the pectoral fin, allowing the extraction of eggs) and placed into a mixing tub. Milt from the male is then stripped directly into the mixing tub containing eggs. After fertilization, eggs are disinfected with a treatment of free iodine and placed into vertical incubation trays. When eggs hatch (approximately 30 days post-spawn depending on water temperatures), alevin and any remaining eggs are moved into deep matrix incubators (DMI) filled with either gravel or artificial substrate (Redd Zone brand bio-balls). As fry emerge from the DMI's, approximately 20 days post-hatch, they volitionally swim out into 3-ft rearing tanks where they are counted and reared until release.

During 2014-2015 streamside spawning, nine females and six males were spawned resulting in nearly 35,000 eggs. The average fecundity per female was 4,538 eggs, and average survival to the eyed egg stage was 75 percent. Survival from the eyed stage to swim-up fry was 96 percent.

### **3.3 Salmon Redd and Carcass Surveys**

Following release of adult fall-run Chinook salmon into Reach 1 in November 2014, CDFW and USFWS began weekly surveys of the restoration spawning reach to quantify and spatially characterize Chinook salmon spawning within the San Joaquin River. The survey team recorded location, timing, and morphological features of each Chinook salmon redd observed. Since Pacific salmon are semelparous, meaning they all die after their first spawn, adult Chinook salmon carcasses encountered during the redd surveys were examined and sampled for subsequent lab analysis. These data provide insight into factors affecting spawning site selection on the San Joaquin River (e.g., water temperature, depth and velocity, incubation habitat quality, amount of nearby cover present) after more than sixty years without a naturally spawning population of salmon. In addition, this provides baseline data for evaluating the success of future river rehabilitation, adaptation of the reintroduced population, and other management actions (e.g., changes in flow timing and magnitude).

During the 2014 redd and carcass surveys, 81 redds were observed and measured, and approximately 100 carcasses were examined and sampled. This is an increase from 2013, when 74 redds and 32 carcasses were observed.

### **3.4 Salmon Incubation Habitat Quality Assessment**

Chinook salmon, spring-run (listed as threatened under ESA and CESA) and fall-run (a California species of special concern) were extirpated from the Restoration Area shortly after construction of Friant Dam. In the absence of a naturally spawning population, this study utilized physical measurements in the planned restoration spawning reach (i.e. below Friant Dam downstream to Skaggs Bridge) to predict whether or not egg survival and fry production will be limited by habitat quality.

In collaboration with USFWS, CDFW installed 10 emergence traps (Figure 6) beginning in January 2015 to monitor fry emergence from fall-run Chinook salmon redds mapped during redd and carcass surveys. Data were collected from a subsample of the 9,784 emerging fry and included fork length, weight, life stage, and tissue samples for genetic analysis. All ten emergence traps were removed by early April once emergence was complete. After trap removal, CDFW staff collected data on physical habitat quality (e.g. grain-size distribution, intragravel flow, temperature) within these and other nearby mapped redds (Figure 7). This data will be compared to observed fry emergence, timing, and condition to assess limiting factors of fry production. A full proposal was submitted in June to the SJRRP Monitoring and Analysis Plan (MAP) Panel for continuing this work during FY 2015/2016.



**Figure 6: Emergence trap installed in winter 2015 to observe fry emergence from a Chinook salmon redd**



**Figure 7: Staff measure intragravel flow within a fall-run 2014 Chinook salmon redd**

### **3.5 Juvenile Monitoring**

Juvenile monitoring provides information on abundance, growth, survival, and migration of juvenile fall-run (and eventually spring-run) Chinook salmon in the system. This data helps to evaluate progress toward meeting the Restoration Goal and informs adaptive management decisions. Rotary screw traps (RSTs) are a type of out-migrant trap that consist of a funnel-shaped cone that is screened and suspended in water between floating pontoons. The cone rotates as water flows past the trap, guiding fish moving downstream into a live box that is attached to the rear of the trap. RSTs are usually installed at a fixed location that can continuously sample for extended periods of time. When placed properly and calibrated, RSTs can provide reliable estimates of juvenile abundance, growth, survival, and migration rates. However, before reliable monitoring data can be attained, and compared over time, consistent monitoring locations must first be selected. The aim of near-term juvenile monitoring has been to evaluate RST efficiencies and to select long-term locations that function over a full range of Restoration Flows.

RST monitoring began in the spring of 2013 when CDFW operated one RST near SR-99, and continued in 2014 with two RSTs operated at the SR-99 and San Mateo sites. RSTs were not deployed in 2015 due to insufficient flows. Although critical low water year types have limited the duration of monitoring and extent of efficiency trials, much information and experience has been gained. This includes a better understanding of RST assembly, deployment, and, insights into efficiency and information on flows necessary to turn the RST cone. However, further experience and site specific information at additional locations is needed before long term RST monitoring sites can be determined. Continued assessments into the suitability of RST locations and optimizing trap efficiencies are therefore important steps for this monitoring activity and may take several seasons under various river flow conditions to achieve.

### **3.6 Stream Temperature Monitoring**

Water temperature is likely a limiting factor for each life history stage of spring- and fall-run Chinook salmon in the San Joaquin River, particularly in the warmest and driest years. Adult salmon need appropriate temperatures for upstream migration, holding, and spawning. Additionally, suitable hyporheic water temperatures during egg incubation and pre-emergence rearing are critical to survival. Stream temperatures must also be adequate during juvenile rearing, smoltification, and outmigration. Furthermore, water temperatures in sections of the Restoration Area may present thermal barriers to successful fish migration, resulting in stranding and/or increased mortality. Understanding the longitudinal distribution of temperatures in relation to factors such as stream flow, air temperature, Friant Dam release temperature, and other influences is critical for the ability to successfully manage the San Joaquin River for restoration of spring- and fall-run Chinook salmon.

The goals of stream temperature monitoring is to better understand the water temperature conditions likely to be experienced by each life stage of spring- and fall-run Chinook salmon in the Restoration Area and to inform management actions to address temperature concerns in the Restoration Area. The study also provides data for a number of other field and computer modeling studies. Study objectives were developed to address questions about the suitability of current conditions to meet the needs of fish and to test hypotheses related to the influence of external factors on stream temperatures.

The objectives of the study are to:

- 1) Collect reliable water temperature data at time and space intervals that sufficiently document thermal response of stream temperatures to Interim and Restoration Flows, local meteorological conditions, and restoration actions;
- 2) Evaluate the temporal and spatial suitability of stream temperatures to support all life stages of spring- and fall-run Chinook salmon in the Restoration Area;
- 3) Determine the effects on instream temperatures of releases from Millerton Reservoir, tributary flows, agricultural returns, riparian shading, and/or channel morphology;
- 4) Identify warm- and cold-water inputs that affect temperature conditions in the SJR; and
- 5) Assess the influence of instream and off-stream pools and mining pits on stream temperatures.

CDFW began collecting San Joaquin River water temperatures in 2002 and developed a more robust monitoring program during the fall 2009 Interim Flow Period. Temperature loggers are deployed throughout the Restoration Area to evaluate subsurface stream temperature conditions in migration pathways and potentially suitable holding, rearing, and spawning habitat. Since 2009, logger deployment has expanded to mining pits, flood bypasses, Salt and Mud Sloughs, and the Newman Wasteway. Data loggers are programmed to record temperatures hourly throughout the year and are downloaded by staff on a monthly to quarterly frequency (Figure 8).





**Figure 8: CDFW scientists installing temperature data loggers in the San Joaquin River**

CDFW scientists provide a Stream Temperature Summary Report to participants of the Flow Scheduling meetings coordinated by Reclamation. These summary reports evaluate real-time temperatures in the Restoration Area compared to temperature objectives for each reach and life stage of Chinook salmon. Current drought conditions have increased the temperature of Friant Dam river releases to the San Joaquin River (Figure 9), which affects both river temperatures and influent temperatures at CDFW fish facilities (i.e., SIRF, San Joaquin Trout Hatchery [SJH], Interim Facility).



## **4 RESTORATION: SITE-SPECIFIC PLANNING**

CDFW staff continued coordinating with the Implementing Agencies on site-specific restoration projects. There are numerous major physical improvements proposed within the 153-mile Restoration Area that are necessary to achieving the Restoration and Water Management goals. The identification and timing of these proposed actions are described in Section 1.6 of this report. These activities will be largely carried out by Reclamation and DWR, but design, planning, and oversight are coordinated with CDFW. CDFW involvement with the major actions carried out in FY 2014/2015 is described below.

### **4.1 Mendota Pool Bypass and Reach 2B Improvements Project**

The Mendota Pool Bypass and Reach 2B Improvement Project includes the construction of the Compact Bypass, which includes a new channel and structures able to convey up to 4,500 cfs of Restoration Flows around Mendota Pool and make deliveries of up to 2,500 cfs into Mendota Pool. Other proposed Reach 2B improvements include increasing the flow capacity of Reach 2B, constructing new fish passage facilities at the Compact Bypass control structure and Chowchilla Bifurcation's riverside control structure, and floodplain restoration of for juvenile rearing habitat (Figure 10).

In November 2014, the SJRRP released the Second Administrative Draft of the Reach 2B Environmental Impact Statement/Report for implementing agency review. The SLC is the lead California Environmental Quality Act (CEQA) agency.

In May 2015, SJRRP staff conducted a site visit of Reach 2B to evaluate potential giant garter snake (*Thamnophis gigas*) habitat. The site visit included a tour of Volta Wildlife Area as a reference site (known occupied habitat) and then a car tour of Reach 2B from Mendota Dam to San Mateo Road crossing. It was determined after the site visit that the SJRRP would reevaluate the quantity and quality of giant garter snake habitat in Reach 2B for impact analysis.



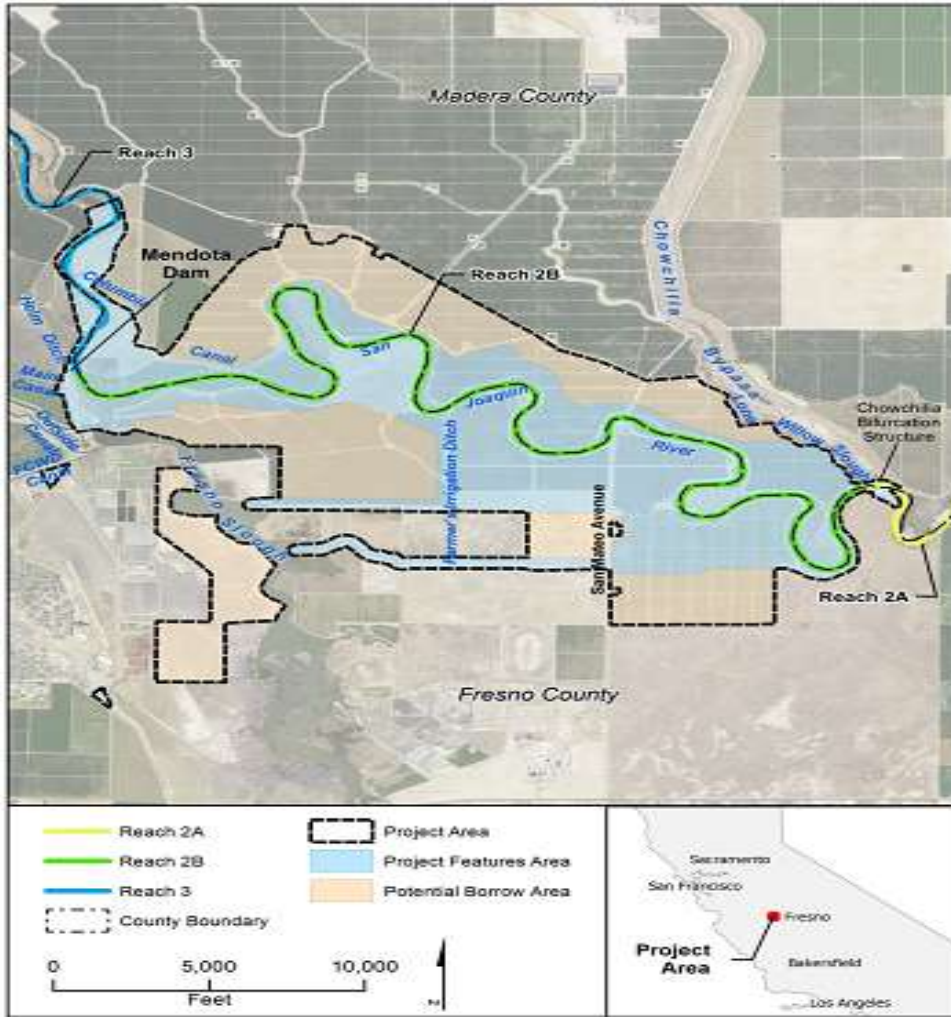


Figure 10: Project Area (Source: Mendota Bypass and Reach 2B Improvements Project Draft EIS/R)

## 4.2 Reach 4B, Eastside and Mariposa Bypass Channel Structural Improvements

Planning for the Reach 4B, Eastside Bypass, and Mariposa Bypass Channel and Structural Improvements project resumed in February 2015. Staff reviewed and provided comments for the Draft Project Description. This proposed project includes modifications of the San Joaquin River channel capacity to enable the conveyance of flows necessary to support anadromous fish migration. Alternatives being formulated encompass flow conveyance of 475 cfs and up to 4,500 cfs through Reach 4B, or the use of alternative routing for pulse flows. Existing flow control structures at Sand Slough and within the Eastside and Mariposa Bypass channels, as well as the San Joaquin River headgate to Reach 4B would be modified to allow for fish passage (Figure 11).



Figure 11: Project Area and Vicinity (Source: Reach 4B Eastside Bypass, and Mariposa Bypass Channel and Structural Improvements Draft Project Description)

## **5 RECREATION**

Prior to 2014, CDFW stocked rainbow trout (*O. mykiss*) at locations below Friant Dam in the San Joaquin River, including Friant Cove and Lost Lake Recreation Area. In 2014, changes in Department policy regarding stocking of trout in anadromous waters led to a decision to stop stocking rainbow trout below Friant Dam. Additionally, restoration of Chinook salmon populations in the San Joaquin River may eventually require regulation changes (e.g., gear restrictions, seasonal fishing closures) that could reduce already limited in-river fishing opportunities.

In preparation for these changes, CDFW has been actively pursuing options to expand warm-water angling opportunities and establish an off-channel trout fishery in a number of ponds adjacent to and disconnected from the river.

Dozens of various sized ponds, remnants of past and current gravel mining operations, are scattered in the San Joaquin River corridor between Friant and Fresno. Those that provide appropriate habitat and access conditions could be used to provide new and expanded fishing options to anglers that otherwise might be displaced by regulatory and fish stocking changes. This enhanced off-river fishery could compensate for changes indirectly triggered by the SJRRP and add to the currently limited public access network in the San Joaquin River corridor.

Beginning in the fall of 2012, CDFW began seasonally stocking trout in an off-channel pond at Sycamore Island Recreation Area, owned by the San Joaquin River Conservancy (Conservancy) and operated by the San Joaquin River Parkway and Conservation Trust (Parkway). In partnership with Trout Unlimited and the Parkway, CDFW helped organize the Third Annual Sycamore Island Trout Derby on March 16, 2015. CDFW operated measuring stations and determined award winners in each age and species category. The event attracted over 300 registered participants.

CDFW is coordinating with the Conservancy, Vulcan Materials, the Parkway, and the DWR for additional projects to enhance recreational fishing in the San Joaquin River corridor. In April, dissolved oxygen and temperature loggers were deployed in an off-channel pond at the Vulcan mining property near Friant to monitor habitat conditions. Staff are continuing to work on an overall planning effort that identifies and assesses opportunities for off-channel fishing access near the San Joaquin River.

### **5.1 Sycamore Island Trout Pond Access Improvement Project**

Sycamore Island Trout Pond is the first of the off-channel recreational fishing ponds planned for enhancement as outlined in the SCARF Environmental Impact Report (EIR). CDFW is planning recreation enhancements including an ADA-accessible fishing platform, a boat launch, and a single vault restroom. CDFW is working with DWR and the Conservancy to construct the new facilities and operate the pond. Preliminary designs and specifications were completed by DWR in June 2014 under an Interagency Agreement, but CEQA must be complete in order to pursue funding for the project through the Conservancy.

In November, Horizon Water and Environmental, LLC, was approved to assist with CEQA compliance. CDFW and Horizon conducted a site visit in December 2014 to start discussions regarding the project description and potential impacts, and a draft project description and CEQA Environmental Checklist was completed in May 2015. CDFW anticipates CEQA compliance for this project will result in preparation of an EIR Addendum or Mitigated Negative Declaration depending on the results of additional impact analyses.

## **6 DROUGHT MANAGEMENT**

Beginning in January 2014, CDFW began pursuing actions to protect native freshwater and anadromous fishes threatened and impacted by the statewide drought. Drought conditions increased water temperatures and decreased water quality in-river and in water supplies provided from the San Joaquin River via Millerton Reservoir for fall- and spring-run Chinook salmon being held at Program fish facilities.

To ameliorate adverse drought conditions, CDFW increased investment in the restoration project to protect spring and fall-run Chinook salmon. This effort sought to ensure Chinook salmon survival during unsuitable river conditions and continued progress in reintroduction and management of both spring- and fall-run Chinook in the San Joaquin River. This effort included:

- Installing water conservation and chiller equipment to maintain water quality and supply at fish rescue and captive rearing facilities to increase fish holding capacity, reduce water supply needs and maintain suitable water temperatures;
- Purchasing fish transports to facilitate fish rescues for translocation to drought-resistant habitat and holding facilities; and
- Monitoring conditions in-river and at the Interim Facility, SJH, and SIRF.

### **6.1 Water Quality Analysis**

CDFW analysis in 2014 and 2015 predicted that temperature issues at the Interim Facility would exceed objectives for health and survival of spring-run Chinook salmon broodstock due to drought conditions (CDFW 2015). Based on the objectives set in the FMP, optimal temperatures for adult Chinook are below 59°F, the critical range is between 62.6 degrees Fahrenheit (°F) and 68°F, and lethal temperatures are over 68°F (based on a 7-day average maximum) (SJRRP, 2010). The upper threshold NMFS 10(A)(1)(a) Permit 14868 allows for handling of spring-run Chinook broodstock is 21°C (69.8°F). Emergency plans for the San Joaquin Trout Hatchery (SJH), which is adjacent to the Interim Facility and utilizes that same water supply conduit from Friant Dam, recommend beginning to decrease trout densities through outplanting if temperatures exceed 64°F.

Based on historical records from the SJH and Reclamation, water temperatures at the hatchery and in the San Joaquin River below Friant Dam prior to 2014 ranged between approximately 45°F and 55°F year-round, with occasional peaks above 58°F. However, due to ongoing drought conditions, temperatures in August 2014 exceeded 60°F and continued to increase until peaking above 70°F in September 2014. Figure 12 shows measured daily average water temperatures from Friant Dam releases into the San Joaquin River for May 2013 through January 2015 (CDEC 2015).

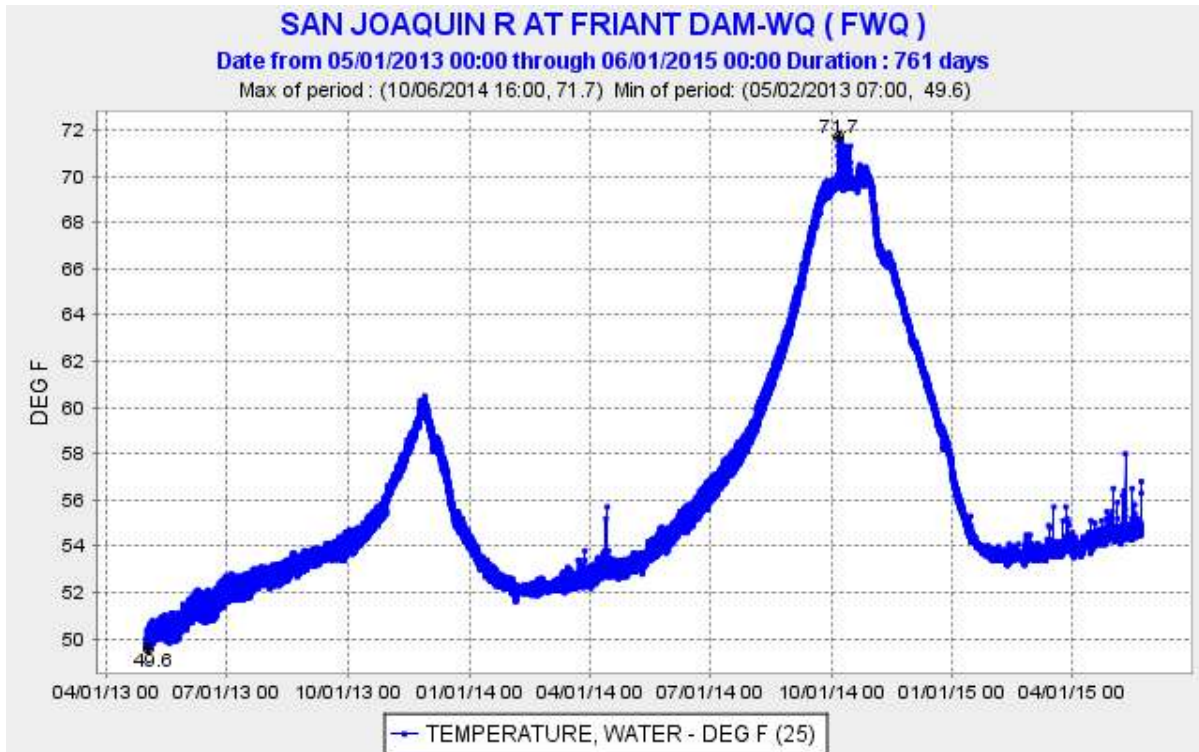


Figure 12: San Joaquin River water temperatures at Friant Dam, May 2013 – June 2015 (Source: CDEC)

There was an unprecedented increase in water temperature during May through mid-September 2014 due to agricultural water releases to Mendota Pool to satisfy Reclamation’s commitments to the Exchange Contractors Water Authority, who hold senior water rights on the San Joaquin River. These releases quickly evacuated the cool water pool in Millerton Lake. The average rate of increase from mid-July through September 2014 was approximately 0.17°F/day and was as high as 0.23°F/day on August 25 through September 20. When water deliveries ceased, water temperature leveled off until the end of October, when air temperatures reduced release temperatures through the end of the year. The cool ( $\leq 56^{\circ}\text{F}$ ) water pool was much smaller than average during 2012 through 2014, which suggests that the effective cool water pool will be depleted much earlier in 2015.

## 6.2 Interim Facility Recirculation/Chiller Project

Due to the high water temperatures in the San Joaquin River during the fall of 2014; exacerbated by low reservoir water storage in Millerton Lake and a depleted cold water pool, a large chiller was rented to maintain suitable water temperatures at the Interim Facility. The chiller was operated from September 4 through December 17, 2014. Ensuring effective operation of the chiller involved the following activities:

- Developing and submitting permit modification request to NMFS to allow use of chiller and associated generators/diesel storage tank, etc.
- Scheduling on-call evening duties with SJH personnel



- Scheduling weekly or biweekly fuel deliveries for the generator used to operate the chiller
- Installing a temperature and oxygen monitoring alarm system
- Installing water recirculation pump to minimize water usage
- Modifying indoor tanks to maximize dissolved oxygen production
- Scheduling safety meetings with SJH staff
- Making regular adjustments to chiller system to maximize chiller effectiveness
- Arranging for generator service every 10 days

Concurrently, CDFW developed plans for installing permanent water chiller systems for all tanks at the facility. Because of the smaller size, multiple-pass chiller units were explored. But, using multiple pass systems would require water treatment to filter out coarse organic matter (i.e., uneaten fish food and fish waste), ammonia removal/nitrogen transformation, and ultraviolet light treatment to destroy pathogens that would otherwise increase in concentration.

CDFW pursued enhancements that involved the installation of nine water recirculation/chiller systems to be operational by late-summer/fall 2015. These systems included two 95-percent water recirculation systems, two self-contained rearing units, and five water reuse systems. The water reuse systems recirculate less water (approximately 70 percent) and function with a simplified filtration system. Each of the five outdoor broodstock rearing tanks would be fitted with water reuse systems. One of the outdoor broodstock rearing tanks would also be fitted with a 95-percent water recirculation system and the three Indoor broodstock rearing tanks would be connected to a single 95-percent water recirculation system. Finally, two self-contained rearing units were to be installed. Each of these systems includes four six-foot diameter tanks for rearing juvenile salmon.

Staff assisted CDFW engineers in designing and procuring the equipment. Staff also assisted in preparing permits necessary to implement the project. The installation is occurring in two phases, Electrical (Phase 1) and Piping and Tanks (Phase 2), consistent with the schedule in Table 5. Phase 1 involved installation of an electrical service panel supplying electricity to each piece of equipment, electrical outlets within the enclosure, and outlets adjacent to each of the large outdoor tanks for ancillary purposes. PG&E installed a transformer and service meter, providing power to the electrical panel located adjacent to Interim Facility enclosure. Trenching for conduit would be required between the electrical service panel and the recirculation systems and to the enclosure.

Phase II construction began in April 2015 with clearing vegetation and grading for installation of the additional tanks and associated water reuse/recirculation and chiller systems. By the end of FY 2014/2015, almost all of the water reuse equipment had been delivered and was being prepared for installation. Concrete pad construction and equipment installation was scheduled to occur within the next fiscal year. CDFW staff were on hand each day of construction during FY 2014/2015 to

monitor contractor activities and ensure compliance with mitigation measures and protection provisions, as well as conservation measures provided by the USFWS for protection of the State and Federally threatened California tiger salamander (*Ambystoma californiense*; CTS).

**Table 5: Proposed Interim Facility Recirculation Project Timeline**

<b>Task Name</b>	<b>Phase 1 Electrical</b>	<b>Phase 2 Piping &amp; Tanks</b>
Finalize System Design	June – Oct 2014	March 2015
Development of Bid Package	Nov 2014	April 2015
Bid Advertising, Award and Contracting	Dec 2014	May 2015
Notice to Proceed	Jan 2015	June 2015
Submittals, Ordering and Delivery	Jan – Feb 2015	June 2015
Construction	May – June 2015	June – Aug 2015
Equipment Testing	July 2015	Sept 2015

### **6.3 Satellite Incubation and Rearing Facility (SIRF) Upgrades**

The SIRF is a small satellite fish facility maintained separately from the Interim Facility site in order to incubate and rear offspring from fall-run Chinook salmon trap and haul efforts. Reclamation provides space at their Friant Dam property and a small amount of additional water for the facility. In response to ongoing drought conditions, CDFW purchased five recirculation units equipped with chillers for use at the satellite facility.

CDFW plans to upgrade the SIRF by installing the recirculation/chiller equipment to the existing incubation trailer and installing new tanks with recirculation/chiller equipment for rearing and holding salmon at the facility. The enhancements also increase the capacity of the facility and will allow for incubation and rearing of spring-run Chinook salmon in the future.

### **6.4 Transports and Monitoring Equipment**

To facilitate fish transport and rescue activities, CDFW purchased two fish transport vehicles. Transport vehicles include two 2016 Ford F550 Super Duty flatbed trucks



that were ordered on June 25, 2015 for delivery next FY. One 600-gallon, 2-compartment fish hauling tank was purchased for mounting on one of the F550s. The tank was ordered on June 29, 2015 and will be delivered at the end of August 2015. The second transport will pull an existing 500-gallon tank trailer.

Additionally, CDFW purchased new in-river water quality monitoring equipment. Gas bubble disease due to high dissolved gas levels in releases from Millerton Reservoir has previously caused fish loss, and conditions are exacerbated by drought. During FY 2014/2015, CDFW purchased and received a total dissolved gas (TDG) and multi-parameter water quality meter for daily monitoring while fish are holding in in-river pens below Friant Dam.

## **7 ENVIRONMENTAL COMPLIANCE AND PERMITTING**

CDFW has jurisdiction over the conservation, protection, and management of fish, wildlife, native plants, and habitat necessary for biologically sustainable populations of those species and is the state trustee for fish and wildlife resources. CDFW must act within its authority, and must obtain a variety of permits, authorizations, or other approvals to fulfill its commitment to the SJRRP.

### **Trustee Agency Authority**

CDFW is a Trustee Agency under CEQA with regard to the fish and wildlife of the state [, to designated rare or endangered native plants, and to game refuges, ecological reserves, and other areas administered by the department] . (Cal. Code of Regs., tit. 14, § 15386.) Pursuant to Fish and Game Code Section 1802, CDFW has jurisdiction over the conservation, protection, and management of fish, wildlife, native plants, and the habitat necessary for biologically sustainable populations of those species. As a Trustee Agency for fish and wildlife resources, CDFW is responsible for providing biological expertise with respect to potentially significant impacts arising from project activities and means to mitigate or avoid such impacts.

### **Responsible Agency Authority**

CDFW acts as a Responsible Agency for a project where another agency is the lead agency and CDFW has discretionary approval over the project. (Cal. Code Regs., tit. 14, § 15381.) This may include issuance of an Incidental Take Permit (ITP), pursuant to the California Endangered Species Act (CESA), or a Lake and Streambed Alteration Agreement (LSAA) issued under Fish and Game Code sections 1600 et seq.

Fish and Game Code section 2080 prohibits the “take” of species that is listed as endangered or threatened under CESA. If a Project could result in the “take” of any species listed as threatened, endangered, or candidate under CESA, CDFW may authorize take by issuing an ITP, pursuant to Fish and Game Code section 2081(b).

CDFW also has regulatory authority with regard to activities occurring in streams and/or lakes along with riparian habitat associated with and supported by watercourses, that could adversely affect any fish or wildlife resource, pursuant to Fish and Game Code sections 1600 et seq.

### **Unlisted Species**

Species of plants and animals need not be officially listed as Endangered, Rare, or Threatened (E, R, or T) on any State or Federal list to be considered E, R, or T under CEQA.

### **Fully Protected Species**

CDFW has jurisdiction over fully protected species of birds, mammals, amphibians, reptiles, and fish pursuant to Fish and Game Code sections 3511, 4700, 5050, and 5515. Take of any fully protected species is prohibited under these statutes and CDFW cannot authorize their “take.”

## **Bird Protection**

CDFW has jurisdiction over actions which may result in the disturbance or destruction of active nest sites or the unauthorized “take” of birds. Fish and Game Code sections that protect birds, their eggs, and nests include sections 3503 (regarding unlawful take, possession or needless destruction of the nest or eggs of any bird), 3503.5 (regarding the take, possession or destruction of any birds-of-prey or their nests or eggs), and 3513 (regarding unlawful take of any migratory nongame bird).

### **7.1 Permits and Authorizations**

The following permits and authorizations have been obtained by CDFW to support Program activities:

- California Air Resources Board Permits
- San Joaquin Valley Air Pollution Control District Permits
- U.S. Army Corps of Engineers Nationwide Permits (Clean Water Act [CWA] Section 404)
- U.S. Fish and Wildlife Service Authorizations
- CDFW Lake and Streambed Authorization Agreements
- State Lands Commission Leases
- Regional Water Quality Control Board (RWQCB) NPDES Permits and CWA Section 401 Certification
- Central Valley Flood Protection Board Authorizations
- Various Access Agreements and Leases

### **7.2 Environmental Compliance and Permitting Group**

The Environmental Compliance and Permitting Group began meeting again in May 2015. Monthly meetings provided updates on Program activities requiring CEQA compliance and/or additional permits from regulatory agencies.

### **7.3 Endangered Species Act Group (ESA Group)**

The ESA Group formed in January 2015 to discuss the potential occurrence of special status fish species in Reach 2B and potential impacts to water users within that area. Spring-run Chinook salmon were excluded from the discussion due to the 4(d)/10(j) rule and Fish and Game Code Section 2080.4 which exempted take spring-run Chinook salmon within the Restoration Area from the Endangered Species Act and CESA, respectively. It was determined that there were no state listed fish species currently within Reach 2B. Federally listed fish would not be able to access Reach 2B until after the larger construction projects, including the Reach 2B project with a fish trap designed to avoid take of fish including special status species, had been completed.

## **7.4 Fisheries Reintroduction Regulatory Team (FRRT)**

The Fisheries Reintroduction Regulatory Team (FRRT) team met monthly to discuss and plan spring-run Chinook salmon reintroduction activities, which included collections of broodstock and translocation fish from the FRH, operations of the Interim Facility, and other permitting needs for Chinook salmon research and monitoring activities.

Two Change of Operating Procedure documents were initiated to allow for minor changes in procedures described in NMFS 10(a)(1)(A) permits 14868 and 17781. The first Change of Operating Procedure document was approved in September 2014 and included the following changes: (1) spawning age-2 broodstock; (2) culling a portion of 2012 and 2013 brood year broodstock due to space limitations; (3) using wild-origin spring-run Chinook salmon for broodstock; (4) installing water recirculation system and chillers and ancillary equipment at the Interim Facility; (5) adopting an emergency plan to relocate fish to Moccasin Hatchery in emergency situations; (6) alteration of collection time period to September 1 through August 31, and (7) changing transportation tank language to general language. A second Change of Operating Procedure document was started in May 2015 and is anticipated to be finalized in 2015.

Ongoing management and research activities conducted by the SJRRP were evaluated for permitting purposes. Permits required for research and monitoring activities include NMFS' 4(d) program, CDFW Lake and Streambed Alteration Agreement, U.S. Army Corps of Engineers' (ACOE) Nationwide Permits, Regional Water Quality Control Board's (RWQCB) 401 Water Quality Certification, State Lands Commission (SLC) leases, and Central Valley Flood Protection Board (CVFPB) Letter of Authorizations. FRRT created a spreadsheet which included all existing and potentially required permits for the activities.

## **7.5 Environmental Impact Report (EIR)**

CDFW prepared an Environmental Impact Report (EIR) to provide the public, responsible agencies, and trustee agencies with information about the potential environmental impacts of the proposed Salmon Conservation and Research Facility (SCARF) and Related Fisheries Management Actions Project (Project). The EIR was prepared in compliance with CEQA of 1970 (as amended) and the State CEQA Guidelines (California Code of Regulations [CCR] title 14, section (§) 15000 et seq.). The purpose of Project is to manage and conserve native salmon and their San Joaquin River habitats for their ecological significance, as well as enhance public recreation. CDFW will support implementation of the SJRRP Restoration Goal through implementation of the Project.

CDFW adopted the *San Joaquin River Restoration Program: Salmon Conservation and Research Facility and Related Management Actions Project EIR* on June 04, 2014 (SCH No: 2012111083). Copies of the EIR and related documents can be found on the CDFW website at:

<https://www.wildlife.ca.gov/Regions/4/San-Joaquin-River>

## **7.6 SCARF Construction**

CDFW, with the assistance of Horizon, is pursuing environmental permits for construction activities occurring within sensitive areas from CDFW's Lake and Streambed Alteration Program, SLC, ACOE, CVFPB, and the RWQCB.

The volitional release channel, the drum filters and sludge drying pond are within the jurisdiction of CDFW's Lake and Streambed Alteration Program and will require a LSAA for construction. CDFW is working on editing the notification for the LSAA and will submit it in 2015 or early 2016 after engineering designs are near completion. Waiting for engineering designs will reduce the need for future amendments to the LSAA.

Volitional release channel construction is also within the jurisdiction of the SLC. CDFW applied for a SLC Lease in July 2014 and received lease #W26788 in December 2014. During review of the lease, Program staff and General Counsel determined that changes were needed prior to signing. CDFW drafted a letter outlining the requested changes and a meeting to discuss requested changes was conducted in June 2015. General Counsel will coordinate with SLC attorneys to address language concerns. A final letter will be drafted to outline the final changes requested to the lease prior to beginning study activities in the fall of 2015.

Construction of the volitional release channel within Waters of the U.S. and the drum filters within a designated wetland will require a Clean Water Act Section 404 permit. To construct these structures, CDFW submitted an application in March 2015 for NWP #7 for Outfall Structures and Associated Intake Structures and NWP #18 for Minor Discharges. CDFW resubmitted the application in May 2015. The application included the completed Biological Assessment (BA) written by Horizon, which assesses the SCARF project impacts to federally listed species. The BA was submitted informally to USFWS and was approved in December 2014.

Initially CDFW pursued a CVFPB encroachment permit for the volitional release channel construction. However after review of the encroachment permit, CVFPB determined that a Letter of Authorization would be issued instead due to the minimal construction occurring within the secondary channel. CDFW received the Letter of Authorization on August 1, 2014.

The Belcher Avenue road widening and volitional release channel construction will impact Waters of the State and requires a Clean Water Act 401 Water Quality Certification (401 Certification). CDFW submitted a 401 Certification application in June 2014 and received 401 Certification from the RWQCB in February 2015. SCARF operation will also require a National Pollution Discharge Elimination System (NPDES) permit from the RWQCB to authorize discharge into the San Joaquin River. CDFW plans to obtain approval through a General Order for Cold Water Aquatic Animal Production Facilities in 2015 or 2016.

### **7.6.1 SCARF Pre-construction Biological Surveys**

In preparation for SCARF construction, CDFW conducted CTS and Branchiopod surveys in 2012-2013 and 2013-2014 in coordination with USFWS. CTS and special status Branchiopods were identified by the EIR to potentially be impacted by SCARF construction. CTS and Branchiopod surveys are each two years in duration and needed to be concluded prior to construction of the SCARF. Surveys focused on potential habitat within the SCARF footprint during the protocol outlined time period for each species.

The proposed SCARF is within 2 miles of multiple CTS occurrences as indicated through a search of the California Natural Diversity Database. Known breeding ponds are located across Friant Road, and additional occurrences are located north of the San Joaquin River in Madera County. Potential upland habitat exists in the proposed project area mainly in the borrow areas which are grassland, and contain many small mammal burrows. Based on potential CTS habitat and the close proximity of known CTS breeding ponds, CDFW conducted protocol level upland habitat and aquatic surveys in accordance with the USFWS and CDFG (2003) Interim Guidance on Site Assessment and Field Surveys for Determining Presence or a Negative Finding of the California Tiger Salamander (Figure 13).

Results were negative for CTS and special status branchiopods for both survey years. CDFW finalized the second year CTS and Branchiopod survey reports in August 2014 and added years one and two survey reports to the BA. Per the EIR, if CTS surveys results are negative for two years, Mitigation Measure BIO-CONSTRUCT-3 minimizing construction impacts for CTS, is not mandatory; however, CDFW plans to implement some measures as Best Management Practices.

The EIR requires that additional surveys for special status plants and animals be conducted prior to construction. CDFW is coordinating internally and with Horizon to plan surveys at the appropriate times. Horizon started rare plant surveys in May 2015 and will conduct additional surveys next year.

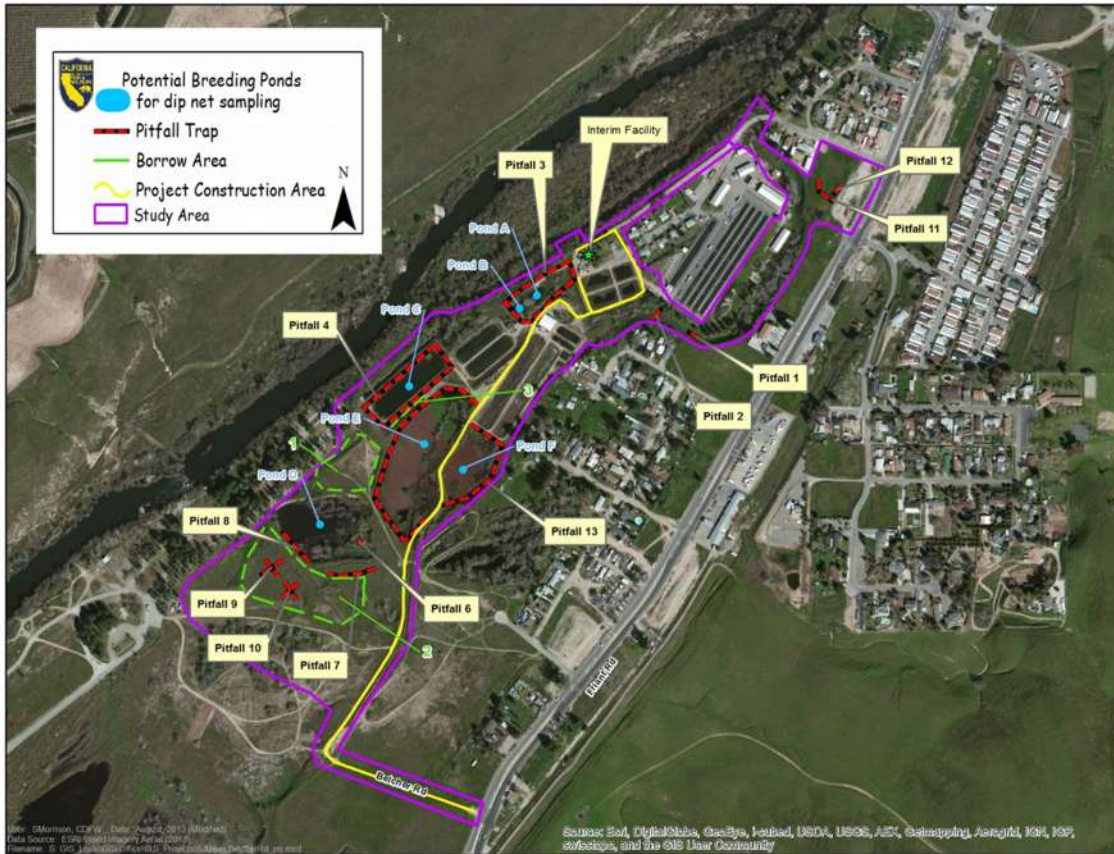


Figure 13: CTS survey activities within both biological study areas

## 7.7 State Lands Commission Leases

In January 2014, CDFW submitted one SLC lease application which included locations used for juvenile monitoring, trap and haul, and acoustic telemetry. The equipment used for these studies is temporarily installed annually throughout the San Joaquin River within SLC jurisdiction. CDFW received the SLC lease in December 2014.

## 7.8 Trap and Haul

In fall of 2014 the Trap and Haul study was changed to include the following: the use of weir style traps along with fyke nets to capture adult Chinook salmon; increase in number of acoustic receivers used and distribution; use of redd grates, artificial redds and emergence traps; and collection of spawning habitat information. The study was also extended annually to the end of May in anticipation of capturing spring-run in the future. In response to the changes the following permits were amended or acquired, including CDFW's LSAA, ACOE's NWP# 4: Fish and Wildlife Harvesting, Enhancement, Attraction Devices and Activities, and CVFPB's Letter of Authorization.



## **7.9 Juvenile Monitoring**

A RWQCB 401 Certification application was submitted in December 2014 for the juvenile monitoring. CDFW received 401 Certification in January 2015, and a CVFPB Letter of Authorization was obtained in December 2014.

## **7.10 Drought Response Permitting**

### **7.10.1 CEQA Addendum**

An addendum to the *San Joaquin River Restoration Program: Salmon Conservation and Research Facility and Related Management Actions Project EIR* was prepared in March 2015 to include analyses of facility improvements pursued under drought response implementation and minor project modifications. The addendum can be found on the CDFW website at: <https://www.wildlife.ca.gov/Regions/4/San-Joaquin-River>

The addendum includes additional CEQA analysis which demonstrated that the drought improvements did not include any additional impacts that were not disclosed in the EIR. Mitigation measures described in the EIR were applied to the drought response implementation projects to reduce impacts to less than significant.

### **7.10.2 Interim Facility Recirculation/Chiller Project**

The Interim Facility, as it currently exists, is insufficient to maintain water quality to sustain Chinook salmon under drought conditions. Additional fish rearing capacity and a protected cool water supply is required to meet the increasing fish inventory, growing biomass and management of unanticipated increased water temperatures. Proposed modifications to the Interim Facility include the installation of additional tanks, water recirculation systems, chillers, and associated appurtenances which would allow the Interim Facility to operate within the existing water supply. In preparation for Interim Facility recirculation system construction, CDFW obtained an LSAA (1600-2013-0205) and CEQA compliance through the EIR addendum. Through agency coordination, it was determined that the recirculation system will be outside of the SLC and CVFPB jurisdiction and will be operated under the existing SJH General Order for effluent discharge for the RWQCB. Additionally, on September 26, 2013, USFWS sent an Intra-Service Section 7 Evaluation Form outlining CTS impact minimization measures CDFW will utilize during construction.

In fulfillment of mitigation measures in the EIR addendum and the LSAA, the CDFW Lands Unit conducted bird and special status mammal surveys on the Interim Facility site in March 2015. No special status species were found within the project site. Raptors were observed nesting and exhibiting mating behavior nearby, but outside of the EIR required buffer. CDFW also implemented USFWS outlined CTS minimization measures including using USFWS approved monitors and exclusionary fencing during construction activities.



### **7.10.3 Satellite Incubation and Rearing Facility (SIRF) Upgrade**

The construction and operation of the recirculation system was added to the EIR addendum for CEQA compliance. CDFW received a letter in March 2015 from RWQCB which indicated that no additional permits were required but that notification would be required with additional changes to the project description. The CDFW Lake and Streambed Alteration Program determined that an agreement would be unnecessary due to the nature and location of the project. Permits from ACOE, SJVFPB, and SLC were deemed unnecessary because they are outside of their jurisdiction. CDFW is currently working with the San Joaquin Valley Air Pollution Control District to permit the back-up generator. Additionally, in compliance with the CEQA addendum, if construction occurs within the bird breeding season, surveys will be conducted to avoid impacts to nesting birds.

### **7.11 Translocation of Brood Year 2014 Juveniles**

In March 2014, the SJRRP received 10(a)(1)(A) Permit No. 17781 to begin translocation of spring-run Chinook salmon from FRH to the San Joaquin River. CDFW was unable to participate in the first year of releases while appropriate CEQA analysis was being completed. With completion of the EIR in June 2014, CDFW was able to participate in the 2015 translocation release. Release activities included rearing spring-run juveniles for a maximum of seven days in net pens tethered to the bank in Reach 5 near HFB. For the new activities, CDFW consulted with CDFW's Lake and Streambed Alteration Program, SLC, ACOE, CVFPB, and the RWQCB. No permits were required from the Lake and Streambed Alteration Program or the RWQCB. Amendments were made to the ACOE Nationwide Permit (NWP) #SPK 2012-01270 and the CVFPB Letter of Authorization. The translocation activities were previously approved in SLC lease W 26664.

### **7.12 4(d) and 10(a)(1)(A) Study Compliance**

In November 2014 the Fisheries Reintroduction Regulatory Team (FRRT) workgroup began discussing 4(d) and 10(a)(1)(A) compliance for ongoing fisheries studies. A spreadsheet was generated detailing which studies would require a 4(d) or 10(a)(1)(A) and documented other permits required to conduct the activities. The spreadsheet was completed in May 2015 and reviewed by the FRRT workgroup. Adult fall-run collections will need 4(d) coverage for steelhead and green sturgeon and 10(a)(1)(A) coverage is needed for steelhead monitoring. Reclamation and CDFW are working to complete additional permitting needs.

#### **7.12.1 Change of Operation for 10(a)(1)(A) permits**

In 2012 and 2014, the SJRRP obtained two 10(a)(1)(A) permits authorizing take of spring-run Chinook salmon for reintroduction. Permit 14868 was issued in October 2012 and authorized take of spring-run Chinook salmon for broodstock cultivation. Permit 17781 was issued in March 2014 and authorized take of spring-run Chinook salmon for translocation, population monitoring and management, release of

ancillary broodstock and conservation stock, and incidental take coverage for steelhead during monitoring activities.

After reviewing the permits, USFWS and CDFW, working with NMFS, requested changes to both permits to allow greater flexibility in fish collection, fish rearing, and broodstock management. Changes were finalized September 2014 in a document entitled "Request for Change of Operating Procedures to NMFS 10(a)(1)(A) Permit No. 14868 and Permit No. 17781, San Joaquin River Restoration Program, Spring-run Chinook salmon Reintroduction, Hatchery Broodstock Collections, Transportation, Rearing, and Spawning".

## 8 PUBLIC OUTREACH

The SJRRP is a complex project affecting local, regional, state, and national interests. It is therefore necessary to increase awareness and understanding about the Program, provide mechanisms that will assist with effective information sharing, solicit and respond to stakeholder and public input, and form partnerships to support efforts that will aid in achieving the overall goals of the Program.

Some of the affected parties include but are not limited to:

- Government agencies
- Tribal entities
- Landowners
- Fisheries and wildlife interest groups
- Agricultural organizations and interest groups
- Environmental and public interest groups
- Recreational interest groups
- Water policy and planning groups
- Elected officials (Federal, State, local)
- Academic institutions
- Media
- Businesses
- General public

Outreach has been facilitated by conducting public meetings and workshops. There have also been a number of facility and resource area tours and public events showcasing the SJRRP while making information available to the public.

Information, in the form of documents and reports, are readily available on the Program website. The Program website (<http://www.restoresjr.net/>) has served as a clearinghouse for most all of the documents and reports prepared by CDFW in coordination with the Program. CDFW specific documents are also made available on the CDFW website (<https://www.wildlife.ca.gov/Regions/4/San-Joaquin-River>).

### 8.1 Trout Derby

CDFW collaborated with the Conservancy, the Parkway, Trout Unlimited, and the San Joaquin River Partnership to hold the second annual Sycamore Island Fishing Derby in April 2015. CDFW stocked trout at Sycamore Island, an off-stream pond

accessible to the public. The event was well-attended with over 331 registered entrants.

## **8.2 Media Events and Coordination**

CDFW provided information and/or was presented on-air and in print for the following media outlets:

- Univision
- The Fish Sniffer Magazine
- CNN
- KQED Public Media for Northern California
- KSEE, NBC affiliate in Fresno
- The Fresno Bee
- ABC Channel 30

## **8.3 Salmon Fest**

CDFW collaborated with the San Joaquin River Parkway and Conservation Trust, Trout Unlimited, the San Joaquin River Partnership, and SJRRP implementing agencies to hold the second annual Salmon Fest at Lost Lake Park in November 2014. The event showcased the SJRRP with agency and resource organization booths, a 5K run, live music and family activities. CDFW was unable to release fall-run adults in the river, as was done during the 2013 event, owing to drought conditions. However, Chinook salmon from the Interim Facility were held in a display tank, attracting a great deal of attention. Estimated attendance was up by 100 visitors compared to 2013 with an estimated attendance of 400 – 500 people.

## **8.4 Sportfish Group Outreach**

CDFW conducted outreach to local angling groups including a San Joaquin River Restoration seminar hosted by Herb Bauer Sporting Goods in Fresno and a presentation to the Fresno Fly Fishers for Conservation at the Fresno County Sportsmen's Club. Both groups have an interest in how the Program will affect angling interests and public access. The meetings provided general Program information and updates on CDFW efforts to manage angling on the San Joaquin River.

## 8.5 Science Meeting

The SJRRP held a two-day Science Meeting in Los Banos to provide a forum where the implementing agencies and participating parties could be informed of scientific research, monitoring, analyses and results pursued by the program. CDFW was well-represented by coordinating with 25% of the material presented. CDFW also received an award for Best Poster and an honorable mention in the poster presentations.

Presentations associated with CDFW efforts included:

- Adult Fall-run Chinook Salmon Trap and Haul
- Acoustic telemetry of adult fall-run Chinook Salmon (*O. tshawytscha*) migration
- Spawning behavior and habitat selection of Chinook Salmon (*O. tshawytscha*) within the San Joaquin River
- SalSim for SJRRP
- San Joaquin River Spawning Habitat Suitability
- Chinook Salmon spawning within the San Joaquin River Restoration Area: A story of success?
- Egg Survival-to-emergence of fall-run Chinook Salmon within the San Joaquin River Restoration Area
- Assessment of the incubation environment in Chinook Salmon redds
- Physical factors and Chinook Salmon egg survival: A study to determine the primary Controls
- Managing precocious maturation in Chinook Salmon (*O. tshawytscha*) captive Broodstock
- Relating egg burial depth to size of Chinook Salmon (*O. tshawytscha*) females and their redds
- Artificial spawning of fall-run Chinook Salmon (*O. tshawytscha*)
- Rotary screw trap site suitability and efficiency assessment
- Relating spawning habitat quality to the composition of fry emergence: Insights from the fall-run 2014 Chinook Salmon (*O. tshawytscha*) spawning population

Many of the presentations from the SJRRP Science Meeting can be found at: <http://www.restoresjr.net/monitoring-data/science-meeting/>

## **8.6 Field Tours**

A variety of field tours were conducted with the media, agency staff, academic interests and public officials. There is an interest in field activities, program facilities and significant project features. CDFW presented to a group of California State University faculty interested in the Program restoration and water management goals at Friant Dam. There were also several tours of the Interim Facility for agency staff and congressional representatives. CDFW also met with the media at the Interim Facility and for news coverage of Program fish releases.

## 9 ENFORCEMENT

The San Joaquin River has typically been a high use area for trout anglers, however, there has been a decline in anglers fishing below Friant Dam since trout stocking ceased. Angling has appeared to increase at Shaver, Huntington, and Wishon lakes where CDFW plants trout, as well as the high country waters in the summer and foothill lakes in the winter. The San Joaquin River also has a large number of homeless individuals living within its banks. Many times officers have seen unlawful fires, littering, Off-Highway Vehicle (OHV) riding, encampments, destruction of habitat for fish and wildlife, and other environmental concerns. This type of activity seems to peak during the summer months.

The San Joaquin River still supports a significant amount of angling and other activity but CDFW law enforcement officers have been limited by river access. Very few areas can be accessed via land-based vehicles, so most of the river has been largely unpatrolled and many boats and shore anglers go unchecked. During the summer of 2015, higher than normal Friant Dam releases allowed wardens to patrol a stretch of river with a small patrol boat. During this time, wardens wrote a significant number of citations during relatively few patrols. It was also noted at this time that many anglers were fishing in places that had restricted access to land patrol vehicles. Observations of large numbers of small water craft utilizing the river indicated that many anglers were going unchecked.

Given these access limitations, the Law Enforcement Division (LED) has written a proposal, with CDFW's SJRRP's assistance, to obtain a small jet boat that can effectively patrol most of the waters of the San Joaquin River in and around the Fresno area. This boat would allow CDFW officers to efficiently patrol these waters to protect the diverse fish and wildlife that the river yields.

The local squad that covers the Restoration Area has been short on personnel due to position vacancies, and enforcement efforts have therefore been reactive rather than proactive. Other area law enforcement in Fresno and Madera counties do not patrol the river via any type of vessel and a boat acquisition will enable CDFW to cover all areas of the river. Patrols are already being coordinated with local agencies if and when LED is able to acquire this vessel. Once there is an ability to properly patrol these areas with a jet boat, many of these concerns will be proactively addressed.

CDFW issued 35 citations in 2015 in the section of the San Joaquin River from Friant Dam to HWY 99.

## 10 STATE FUNDING AND EXPENDITURES

### 10.1 Funding

**Proposition 84:** CDFW funding to support implementation of the Settlement comes, primarily, from State proposition 84, passed by California voters in November 2006. Proposition 84 funds are administered by the California Natural Resources Agency and provide \$100 million for Settlement implementation, of which, \$60 million is allocated to DWR and \$40 million is allocated to CDFW.

**Proposition 13:** CDFW has also relied upon State proposition 13 funds, of which, \$5 million has been allocated to contribute to restoration efforts.

**Sport Fish Restoration Act (SFRA):** While grants were received during FY 12/13 and FY 13/14 to pursue opportunities for enhancing off-river fishing opportunities in the San Joaquin River corridor, no SFRA funding was received in FY 2014/2015.

**Bureau of Reclamation:** Beginning in 2012, Reclamation entered into annual operations and maintenance agreements to fund hatchery operations for a period of ten years estimated to total \$9,500,000 with annual costs ranging from \$475,000 with initial operation of the Interim Facility, to \$1,100,000 for operation of the full-scale SCARF. During the reporting period, Reclamation reimbursed CDFW through the SCARF Operations and Maintenance (O&M) Agreement, \$627,917.00 towards O&M for the Interim Facility. Reclamation has not committed to funding SCARF operations past 2022, although the facility is expected to continue to be needed beyond that date.

**Drought Management:** \$38 million was provided to CDFW to respond to the effects of the California drought on fish and wildlife, of which, \$2 million was provided for increased investment in the San Joaquin River Restoration Program restoration goal. Funds were provided to improve infrastructure, fish rescue, monitoring, and enhanced restoration activities.

### 10.2 Expenditures

Table 6: Fiscal Year 2014/2015 Expenditures

DESCRIPTION	AMOUNT
<b>Proposition 84</b>	
Personnel	\$903,841



Operating Expenses	\$69,667
Equipment	\$8,860
Contracts	\$9,175
<b>TOTAL</b>	<b>\$991,543</b>
<b>Proposition 13</b>	
Personnel	\$0
Operating Expenses	\$0
Equipment	\$0
Contracts	\$373,474
<b>TOTAL</b>	<b>\$373,474</b>
<b>Hatchery Operations and Maintenance</b>	
Personnel	\$249,219
Operating Expenses	\$38,456
Equipment	\$8,808
Contracts	\$3,750
<b>TOTAL</b>	<b>\$300,233</b>
<b>Drought Implementation</b>	
Personnel	\$0
Operating Expenses	\$67,636
Equipment	\$860,103
Contracts	\$1,033,573
<b>TOTAL</b>	<b>\$1,961,312</b>
<b>Total Expenditures</b>	
<b>\$3,626,562</b>	



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