SJRRP Brood Year 2014 Implementation Plan for Fish Reintroduction Actions

Table of Contents

Executive Summary **4**
Introduction 4
Special Considerations for BY 2014 4
Spring-Run Chinook Salmon Actions 4
Broodstock 4
Salmon Releases 4
Fall-run Chinook Salmon Actions 5
Adult Trapping and Transport 5
Streamside Spawning and Rearing 5
Juvenile Emigration Assistance Study 5
1.0 Purpose **6**
2.0 Introduction **6**
2.1 Special Considerations for Brood Year 2014 6
2.1.1 Spring-run Broodstock Collections 6
2.1.2 Spring-run Juvenile Translocation 6
2.1.3 Adult Trap and Haul 7
2.1.4 Streamside Spawning 7
2.1.5 Fall-run Juvenile Releases 7
3.0 Spring-Run Chinook Salmon Actions **7**
3.1 Broodstock 8
3.1.1 Collection of Eggs for Broodstock 8
3.1.2 Transportation of Eggs to Quarantine 9
3.1.3 Marking of Juveniles 10
3.1.4 Transportation of Juveniles to SCARF 10
3.2 Translocation 11
3.2.1 Collection of Juveniles for Translocation 11
3.2.2 Marking of Translocation Juveniles 12
3.2.3 Transport of Translocation Juveniles to San Joaquin River 12
3.2.4 Holding and Release of Translocation Juveniles 13
3.2.5 Monitoring of Released Juveniles 14
4.0 Fall-Run Chinook Salmon Actions **14**
4.1 Adult Trapping 14
4.1.1 Trapping 14
4.1.2 Transportation to Reach One 15
4.1.3 Monitoring of Adults in Reach One 16
4.2 Streamside Spawning 18
4.2.2 Spawning and Egg incubation 18
4.2.3 Rearing 18
4.2.4 Release 19
4.2.5 Monitoring of Streamside Spawning Juvenile Production 19
5.0 Monitoring Methodology **20**
5.1 Rotary Screw Trapping 20
5.1.1 Action and Purpose 20
5.1.2 Roles and Responsibilities 21

Table of Contents

5.1.3 Resources Needed 21
5.1.4 Regulatory Requirements 21
5.1.5 PMT Decision 21
5.2 Acoustic Tagging and Recoveries Downstream of Restoration Area 21
5.2.1 Action and Purpose 21
5.2.2 Roles and Responsibilities 22
5.2.3 Resources Needed 22
5.2.4 Regulatory Requirements 22
5.2.5 PMT Decision 22
5.3 CWT Recoveries in Downstream Reaches, the Delta and Ocean 22
5.3.1 Action and Purpose 22
5.3.2 Roles and Responsibilities 23
5.3.4 Regulatory Requirements 23
5.3.5 PMT Decision 23

Executive Summary

Introduction

The SJRRP's Near-term Strategy for Fish Reintroduction lays out a number of actions that the program will pursue over the next few years prior to the completion of the Phase-1 construction projects and the ability to convey adequate flows through the system due to levee and seepage constraints. This document lays out the operational aspects of the specific actions that will be carried out in brood year 2014.

Special Considerations for BY 2014

The low water conditions resulting from the current drought in the Central Valley have created conditions in the system that are not ideal for fish survival or the successful implementation of the Program's fish reintroduction activities. The Program will monitor conditions and may cancel or modify activities based on expected conditions in the system.

Spring-Run Chinook Salmon Actions

In 2014, the spring Chinook actions will focus on two areas:

1. Developing a third year class of spring-run Chinook for broodstock, and
2. Translocating Feather River Hatchery fish to the San Joaquin River for release.

Broodstock

Spring-run Chinook will be spawned at Feather River Hatchery in order to collect the eggs (560) needed for the 2014 broodstock program. Of the 560 eggs collected, 60 will be used for lethal pathology screenings leaving 500 eggs to be transferred from Feather River fish hatchery for use by the program after 30 days of quarantine at the Silverado Fishery Base (Table 1).

Salmon Releases

The Program plans to translocate juveniles (~54,400) from the Feather River Fish Hatchery for translocation to and release in the San Joaquin River (Table 1). Juveniles will be reared to a taggable size at Feather River Fish Hatchery, coded wire tagged, and adipose clipped prior to transfer to the San Joaquin River where they will be held below Friant Dam (e.g., circular tanks near the auxiliary trailer, net pens) for acclimation and to aid imprinting before transfer to the release site.

Currently, Program staff is actively collecting data to help inform reintroduction, and other Program decisions. Questions regarding water year type, flow constraints, water temperature regimes, and passage impediments are still being investigated. Restoration Flow releases commenced on January 1, 2014. Flow and seepage easements to allow base flow releases to be made below Sack Dam are in progress and may be completed by spring 2015. Paragraph 11 construction projects to address major passage issues are still in the permitting and design phase. Passage impediments still exist at a number of structures and unscreened diversions still contribute to entrainment risk along the river corridor. The near-term reintroduction strategy is to release all spring-run juveniles into the San Joaquin River below Sack Dam with the expectation that there will be survival to the downstream extent of the Restoration Area and beyond.

Table 1. Donor Stock Collection Recommendations – Spring run Chinook salmon brood year 2014				
Source	**Lifestage**	**Number**	**Purpose**	**Disposition**
Feather River Fish Hatchery (ALL)	Spring-run eyed eggs	60	Pathology	Euthanized
	Spring-run eyed eggs	500	Broodstock Development	Interim Facility
	Spring-run eyed eggs	80,000	Translocation	San Joaquin River Restoration Area

Fall-run Chinook Salmon Actions

Adult Trapping and Transport

A major action for fall-run Chinook in 2014 is the trapping of adult fish needed to complete Reach 1 biological studies and streamside spawning evaluations in the San Joaquin River. 2014 represents the third year of this effort. If suitable river conditions exist, adult Chinook will be captured by traps located above Hills Ferry Barrier and by dip netting from sloughs and canals connected to the Restoration Area.

A portion of the adults will be released in Reach 1 where the fish will be able to access suitable habitat and spawn in the Restoration Area. Adult salmon spawning in the Restoration Area will provide the Program with an opportunity to observe spawning adults to inform future efforts including assessing the risk of genetic introgression between fall-run and spring-run, adequacy of spawning and rearing habitat, and the timing of emergence and migration. A subset of the released females will be implanted with acoustic tags to facilitate tracking the habitat used by the adults prior to redd building and spawning. Additional monitoring will include redd surveys, carcass counts, and subsequent juvenile monitoring.

Streamside Spawning and Rearing

If suitable conditions allow, a subset of captured adults will be streamside spawned, the eggs incubated, and the resulting juveniles reared in net pens located below Friant Dam. These juveniles will serve as the source for juvenile fish studies conducted by the Program. All juveniles released within the Restoration Area will be coded wire tagged and adipose clipped to allow differentiation from any juveniles produced from natural spawning of transported fish. Juveniles that are produced in excess of study needs will be released to the system downstream of major passage barriers. A minimum of 25% of these juveniles will be coded wire tagged and adipose clipped.

Juvenile Emigration Assistance Study

The Phase 1 projects of the Program and the ability to release full level Restoration flows are not expected to be completed for several years. Additionally, in critical water years after completion of major projects, salmon may encounter no connectivity or poor migratory conditions. The Program is evaluating options for facilitating juvenile passage for both the near term and for low water years to determine if actions should be pursued to meet either the short term objective of advancing reintroduction prior to construction project completion or providing relief during critical years after populations are established in the Restoration Area. One potential option is to capture migrating juvenile salmon higher up in the Restoration Area and transport and release them lower in the system where they will be able to migrate out of the system successfully.

1.0 Purpose

This document is an operational plan for the salmon reintroduction actions the San Joaquin River Restoration Program (SJRRP or Program) intends to implement in Brood year (BY) 2014. This document briefly describes each of the actions, their purpose, parties responsible for implementation, regulations that must be met before the action is implemented, and decisions required by the PMT for their completion. This document contains information described in other documents such as the Annual Donor Stock
Collection Plan and Monitoring and Analysis Plan.

2.0 Introduction

The Stipulation of Settlement (Settlement) resulting in the San Joaquin River Restoration Program requires the reintroduction of Chinook salmon to the San Joaquin River. Successful restoration of Chinook salmon populations will require channel improvements, habitat restoration and creation, modifications to structures, as well as direct fish reintroduction actions. Channel and habitat improvement projects will be completed over the next several years, and reintroduction actions will increase over time as these projects are completed and the Program's productive capacity increases with construction of the San Joaquin Salmon Conservation and Research Facility (SCARF).

The program may implement several actions for BY 2014 that will contribute to establishing sustainable populations of Chinook salmon to the San Joaquin River. These primary actions include:

- Collecting spring-run juveniles from Feather River Fish Hatchery (FRFH) to be reared for program broodstock at the SJRRP Interim SCARF.
- Translocating and releasing spring-run juveniles from FRFH into the San Joaquin River.
- Trapping fall-run adults that enter the San Joaquin River to:
  - Transport them above barriers to allow natural spawning
  - Initiate streamside spawning to provide juveniles for release into the system consistent with study plans.

Monitoring activities that are designed to evaluate the effectiveness of these actions are also described in this document. The full range of monitoring activities and complete study plans will be described in the SJRRP's FY2015 Monitoring and Analysis Plan.

2.1 Special Considerations for Brood Year 2014

Due to the current drought and extreme conditions in the San Joaquin River, consideration is being given to the limitations associated with planned fisheries-related actions. The description below describes proposed criteria on determining how river conditions would affect fish collection, transport, rearing, and release activities this Fall and Spring.

2.1.1 Spring-run Broodstock Collections

The California Department of Fish and Wildlife has installed chillers at the interim conservation facility. With these chillers in place, the Program expects to be able to maintain suitable temperatures at the interim facility, and does not anticipate any temperature or water-related impediments to proceeding with establishing a brood year 2014 captive brood stock.

2.1.2 Spring-run Juvenile Translocation

The current Section 10(a)(1)(A) permit held by the program lays out criteria for the collection and translocation

of juveniles for transport and for adjusting holding protocols based on in-river temperatures or observations of mortality. The Program expects to follow these guidelines in determining how to proceed with juvenile translocation efforts. If conditions in the Restoration Area would preclude successful survival and migration of juvenile salmonids such as no passage out of the system or water temperatures not suitable for the holding or survival of fish in the system (18 °C) then fish would not be translocated from Feather Fish Hatchery to the San Joaquin River. Once fish are translocated, holding times and release protocols would be abbreviated if temperatures are projected to exceed 22 °C while fish are being held.

2.1.3 Adult Trap and Haul

It is expected that conditions in Reach 1 will be similar or better than conditions above Hills Ferry Barrier and in the canals and sloughs where adults are trapped. While trapping and transporting these fish is likely to cause additional stress and increase mortality, leaving them in the lower river would result in certain death without any opportunity to spawn. Even if water temperatures in Reach 1 are above objectives for spawning, moving fish to Reach 1 would allow for the potential for fish to hold until conditions for spawning improve, as well as provide the Program with valuable information on the limitations of trap-and-haul methods during drought years. As long as conditions in Reach 1 are similar or better than conditions in the trapping locations, and would allow for fish to survive the collection and transport process, the Program will proceed with trapping and hauling adult fish as planned.

2.1.4 Streamside Spawning

A subset of ripe adults will be spawned artificially, and eggs incubated at the auxiliary trailer on USBR property at Friant Dam. In recent years, eggs were incubated at relatively high temperatures (15.2 °C in 2012 and 15.8 °C in 2013, highest instantaneous measurements during the incubation period), and survival ranged from 15 to 96 percent for individual spawns and averaged 94 and 68 percent, respectively, in 2012 and 2013. Fish Management Plan (SJRRP 2010) objectives list 12.8 °C as the upper acceptable limit for egg incubation, with temperatures higher than 15.6 °C being potentially lethal for eggs. Based on this and previous experience, the Program proposes that no eggs be taken for spawning if the 7-day average daily maximum is higher than 15.6 °F. CDFW is pursuing the installation of chillers at the streamside rearing facility. If the chillers and other equipment are installed the Program will be able to proceed with streamside spawning and rearing despite high in-river temperatures.

2.1.5 Fall-run Juvenile Releases

If drought conditions persist, we may need to consider also limiting our activities with juveniles this spring. For the purposes of this discussion, this refers to holding and releasing fall-run juveniles that were streamside spawned and those captured in other monitoring efforts. The Fish Management Plan (SJRRP 2010) objectives list 18°C as the upper limit for migrating juveniles, with prolonged exposure at temperatures over 24°C being lethal.

The Program proposes the following options for guiding juvenile activities:

- For the movement of juveniles from upstream to downstream locations, we propose using the same
- temperature limits as specified for spring-run translocation in the 10(a)1(A) described above.
- For instream monitoring activities that require capture of juvenile salmonids, activities should cease once the 7 day average maximum temperatures reach 25.6°C.

3.0 Spring-Run Chinook Salmon Actions

In 2014, the spring Chinook actions will focus on two areas:

1. Developing a third year class of spring-run Chinook for broodstock, and
2. Translocating Feather River Hatchery fish to the San Joaquin River for release.

Implementation of the broodstock component of the plan will require the completion of four actions. These actions are as follows:

- Collecting eggs for broodstock from Feather River Hatchery
- Transporting the collected eggs to the Silverado Fisheries Base quarantine facility
- Marking juveniles produced from the eggs
- Transporting the juveniles to SCARF

The translocation component of the plan has five major actions associated with it:

- Collecting of juvenile fish from Feather River Hatchery for translocation to the San Joaquin River
- Developing a transportation plan for these juveniles
- Marking the translocation juveniles
- Release of translocation juveniles and
- Monitoring of juveniles as they rear and migrate in the system

3.1 Broodstock

All actions and monitoring required for developing a 2014 year class of spring-run Chinook broodstock are discussed below.

3.1.1 Collection of Eggs for Broodstock

3.1.1.1 Action and Purpose

Spring-run Chinook will be spawned at Feather River Hatchery in order to collect the eggs (560) needed for the 2014 broodstock program. Eggs will be selected from a total of 105 crosses as described in the mating protocols for the program.

3.1.1.2 Roles and Responsibilities

Successful completion of the egg collection will require coordination between regulatory, biological, pathology and hatchery staff from CDFW, USFWS and NMFS.

Roles

Action Lead: Paul Adelizi. (CDFW)

Participating Staff (CDFW): Mike Grill, Bridget Fletcher, Thomas Gromis, Jennifer Eberly, Robert Delmanowski, Benessa Espino.

Participating Staff (USFWS): Zachary Jackson, Jerrad Goodell, Crystal Castle, Nathan Cullen.

Key Coordination Staff: CDFW (Fresno), Paul Adelizi; CDFW (FRFH), Anna Kastner; CDFW (Pathology) Mark Adkison; CDFW (Tissue Archive), Lea Koerber; NMFS (regulatory), Elif Fehm-Sullivan, and NMFS (Science Center), Carlos Garza (NMFS).

Responsibilities

Paul Adelizi will:

- Receive final spawning dates from Anna Kastner (tentatively starting September 19) and inform
- Carl Mesick and Elif Fehm-Sullivan
- Finalize protocols data sheets for selecting eggs
- Coordinate ovarian fluid sampling and virology results with the Fish Health Lab
- Assist with spawning and segregation
- Separate broodstock eggs from select crosses (late October 2014)

CDFW:

- Coordinate tissue and CWT collections with the Tissue Archive and tissue sample analysis with Carlos Garza (Note: Tissue Archive personnel are present during spawning and will collect tissues and CWTs).

USFWS will:

- Assist with spawning and segregating
- Once notified of collection dates, times, number, and procedures will inform NMFS 2 weeks prior to any actions taken under the permit.

3.1.1.3 Resources Needed

No additional resources are required to complete this task.

3.1.1.4 Regulatory Requirements

A copy of 10(a)(1)(A) Permit #14868 must be on hand during all egg collection activities.
USFWS must inform NMFS two weeks prior to all planned actions under permit #14868.

3.1.1.4 PMT Decisions Needed

None.

3.1.2 Transportation of Eggs to Quarantine

3.1.2.1 Action and Purpose

Spring Chinook eggs required for broodstock need to be transferred to and reared at the Silverado Fisheries Base quarantine facility after collection (late October 2014) to ensure that fish are disease-free prior to transport to the Interim Facility.

3.1.2.2 Roles and Responsibilities

Roles

Action Lead: Paul Adelizi (CDFW)

Participating Staff: Anna Kastner (FRFH) and Mike Ficele (SFB).

Key Coordination Staff: Paul Adelizi (CDFW) and Anna Kastner (FRFH)

Responsibilities

Paul Adelizi will:

- Determine eyed egg stage timing from Anna Kastner
- Finalize all protocol data sheets for transporting eggs
- Coordinate with SFB about receipt of eggs for quarantine (water chiller unit must be in place and running one week before receipt of eggs).
- Transport eggs to SFB
- Anna Kastner will:
- Oversee care for juveniles while at FRFH

3.1.2.3 Resources Needed

No additional resources needed.

3.1.2.4 Regulatory Requirements

A copy of 10(a)(1)(A) Permit #14868 must be on hand during all egg collection activities.

USFWS must inform NMFS two weeks prior to all planned actions under permit #14868.

3.1.2.5 PMT Decisions Needed

None.

3.1.3 Marking of Juveniles

3.1.3.1 Action and Purpose

Juvenile fish will be marked at the SFB prior to being transported to the San Joaquin River Basin. The marking of these fish identifies them as Program fish as they migrate to and from the river system.

3.1.3.2 Roles and Responsibilities

Roles

Action Lead: Paul Adelizi (Lead)

Participating Staff: Mike Ficele (SFB), Zachary Jackson (USFWS)

Key Coordination Staff: Paul Adelizi (CDFW) and Mike Ficele (SFB)

Responsibilities

Paul Adelizi will:

- Coordinate protocols and develop data sheets for coded-wire-tag (ing) of broodstock
- Coordinate CWT tagging and timing with Mike Ficele (SFB)

Zachary Jackson (USFWS) will:

- Provide CWT tags and codes for BY 2014 juveniles

3.1.3.3 Resources Needed

CWT tags and tag numbers for the 2014 brood year.

3.1.3.4 Regulatory Requirements

A copy of 10(a)(1)(A) Permit #14868 must be on hand during all egg collection activities.
USFWS must inform NMFS two weeks prior to all planned actions under permit #14868.

3.1.3.5 PMT Decision

None.

3.1.4 Transportation of Juveniles to SCARF

3.1.4.1 Action and Purpose

Juvenile fish from the SFB will be transported to the SCARF for rearing.

3.1.4.2 Roles and Responsibilities

Roles

Action Lead: Paul Adelizi (Lead) with Jamie McGrath-Castro or Doug Aubushon

Participating Staff: Mike Ficele (SFB)

Key Coordination Staff: Paul Adelizi (CDFW) and Mike Ficele (SFB)

Responsibilities

Paul Adelizi will:

- Coordinate transfer activities with Mike Ficele (SFB manager).
- Finalize all protocols and data sheets for transporting juvenile fish to the facility

3.1.4.3 Resources Needed

No additional resources are required to complete this task.

3.1.4.4 Regulatory Requirements

A copy of 10(a)(1)(A) Permit #14868 must be on hand during all egg collection activities.
USFWS must inform NMFS two weeks prior to all planned actions under permit #14868.

3.1.4.5 PMT Decisions Needed

None.

3.2 Translocation

All actions and monitoring required for completing Translocation of brood year 2014 Chinook salmon is discussed below.

3.2.1 Collection of Juveniles for Translocation

3.2.1.1 Action and Purpose

Juvenile spring Chinook will be taken from Feather River Hatchery. These fish will be marked and released to the San Joaquin River to provide the juveniles required to achieve program production and study goals.
The fish will be held at Feather Fish Hatchery until they are tagged.

3.2.1.2 Roles and Responsibilities

Roles

Action Lead: Paul Adelizi (CDFW)

Participating Staff: Zachary Jackson, Jerrad Goodell, Crystal Castle, and Nathan Cullen (USFWS)

Key Coordination Staff: Zachary Jackson(USFWS), Paul Adelizi (CDFW)

Responsibilities

Paul Adelizi will:

- Coordinate with hatchery staff regarding the number, size, and condition of fish being translocated from the Feather River Hatchery.
- Coordinate with hatchery staff to ensure fish are ad-clipped and coded wire tagged

3.2.1.3 Resources Needed

CDFW will provide cages for holding translocation fish.

3.2.1.4 Regulatory Requirements

Need to have a copy of 10(a)(1)(A) permit #17781 on hand during collections and handling.
USFWS must inform NMFS two weeks prior to all planned actions under permit #17781.

3.2.1.5 PMT Decisions Needed

Determine if Program will proceed based on river conditions.

3.2.2 Marking of Translocation Juveniles

3.2.2.1 Action and Purpose

All juvenile Chinook from the translocation program will be coded-wire-tagged prior to transferring from Feather River Hatchery for release in the San Joaquin River. Marking is needed to distinguish translocation fish from other program release groups and hatchery programs outside of the basin.

3.2.2.2 Roles and Responsibilities

Roles

Action Lead: Zachary Jackson (USFWS)

Participating Staff: Jerrad Goodell, Crystal Castle, and Nathan Cullen (USFWS)

Key Coordination Staff: Zachary Jackson (USFWS) Anna Kastner, Paul Adelizi (CDFW)

Responsibilities

Zachary Jackson (USFWS) will:

- Coordinate tagging efforts at the hatchery
- Coordinate with hatchery staff that translocation fish are ad-clipped and coded wire tagged.
- Ensure data summaries of tagging operations will be produced by the tagging crews, including
- information on the number tagged, their size and condition.

3.2.2.3 Resources Needed

Purchase of coded wire tags in Fall 2014.

3.2.2.4 Regulatory Requirements

USFWS must inform NMFS two weeks prior to all planned actions under permit #17781.

3.2.2.5 PMT Decisions

None.

3.2.3 Transport of Translocation Juveniles to San Joaquin River

3.2.3.1 Action and Purpose

After the fish are tagged, they will be transported by truck to the San Joaquin River. The purpose of this action is to deliver Program fish for temporary holding and release to the river.

3.2.3.2 Roles and Responsibilities

Roles

Action Lead: Paul Adelizi or Matt Bigelow, Pat Ferguson (CDFW), Zachary Jackson (USFWS)

Participating Staff: CDFW and Jerrad Goodell, Crystal Castle, and Nathan Cullen (USFWS)

Responsibilities

Matt Bigelow and/or Patrick Ferguson and Zachary Jackson will:

- Coordinate preparation and use of transport tanks and vehicles

- Oversee transport of juveniles to holding location (e.g., tanks, net pens)

3.2.3.3 Resources Needed

Rent a 1-ton dual axel truck.

3.2.3.4 Regulatory Requirements

Need approved 10(a)(1)(A) permit #17781on hand for collection/transport of translocation fish.

3.2.3.5 PMT Decisions Needed

None.

3.2.4 Holding and Release of Translocation Juveniles

3.2.4.1 Action and Purpose

Translocation fish will be held in holding pens in the Restoration Area or in tanks near the auxiliary trailer to allow for imprinting, acclimation, and to monitor tag retention prior to release to the river. The length of the holding period will depend on the timing of receiving a 10(a)(1)(A) permit and conditions in the river.

3.2.4.2 Roles and Responsibilities

Roles

Action Lead: Matt Bigelow (CDFW)

Participating Staff: Matt Bigelow and Patrick Ferguson (CDFW); John Netto (USFWS)

Key Coordination Staff: Zachary Jackson, Jerrad Goodell (USFWS) and Matt Bigelow (CDFW)

Responsibilities

Matt Bigelow will:

- Oversee net pen construction and placement in the river
- Oversee care of juveniles while in net pens

John Netto will:

- Coordinate decision on holding time in net pens with NMFS, CDFW, and USFWS management and technical staff.

3.2.4.3 Resources Needed

No additional resources are required to complete this task.

A crew of two CDFW staff will be necessary for a minimum of two weeks and potentially from mid-February through April 15, to feed and clean tanks or holding pens. CDFW will construct streamside tanks or intall net pens to hold juveniles in river. Resources for releases include truck bed transport tank and/or a CDFW tank with a leased truck. A crew of two (either CDFW or USFWS staff) at minimum will transport fish to designated release locations on multiple days.

3.2.4.4 Regulatory Requirements

USFWS must inform NMFS two weeks prior to all planned actions under permit #17781.

3.2.4.5 PMT Decisions Needed

None.

3.2.5 Monitoring of Released Juveniles

Rotary screw traps (RSTs) will be used to estimate juvenile Chinook salmon relative abundance, migratory timing, and size for fish released in the upper reaches of the Restoration Area. No rotary screw traps will be installed downstream of the Spring-run Chinook salmon release site near the confluence with the Merced River.

Trawl operations at Mossdale and Chipps Island and salvage operations at the State and Federal pumping facilities will be used to evaluate migratory timing outside the Restoration Area.

4.0 Fall-Run Chinook Salmon Actions

The major actions for fall-run Chinook in 2014 are:

1. The trapping of adult fish for release or other uses
2. Streamside spawning and rearing for juvenile releases Trapping of juveniles for release downstream

Trapping Locations - fish will be collected in Reach 5 of the Restoration Area with traps installed or manual collections in the following general areas:

1. Immediately upstream of the HFB
2. ¼ mile upstream of HFB
3. China Island at Mud Slough
4. Mud Slough Bridge on Grassland Wildlife Refuge
5. Van Clief Road
6. Beaver Dam at Reach 4B2 / 5 Boundary
7. Salt Slough near southwest of elk refuge on San Luis Wildlife Refuge
8. Salt Slough at Wolfsen Road Bridge
9. Upstream of Highway 165 Bridge

Because it is unknown whether sufficient adults can be trapped in 2014 to complete all three tasks, the tasks have been prioritized as follows:

1. Streamside spawning
2. Reach one releases

4.1 Adult Trapping

4.1.1 Trapping

4.1.1.1 Action and Purpose

Returning adults will be collected near the confluence with the Merced and relocated to the upper Restoration Area. The purpose of the trapping effort is to collect the adults required for conducting:

1. Streamside spawning studies
2. Reach 1 studies

4.1.1.2 Roles and Responsibilities

Roles

Action Lead: Donald Portz (BOR)

Participating Staff: Matt Bigelow (CDFW), Donald E. Portz (BOR) and Zachary Jackson (USFWS)

Responsibilities

Don Portz will:

- Coordinate trap placement and operation
- Provide staff for trap operation
- Coordinate with transportation and survey teams

Matt Bigelow will:

- Coordinate dip netting efforts
- Provide staff for dip netting efforts
- Coordinate with transportation and survey teams

Zac Jackson will:

- Coordinate with transportation and survey teams
- Supervise redd, carcass, and emergence trapping surveys

4.1.1.3 Resources Needed

A two to three person crew (depending on flows) will install and maintain up to eight fyke nets or weirs in Reach 5. A four wheel drive pickup truck with a transport tank is needed to reach sampling sites and transport fish to one location before being translocated to Reach 1. External disk tags and acoustic tags are required for tagging individual fish for monitoring in spawning areas.

A four-person crew will be deployed 2-3 days per week to conduct redd and carcass surveys between Friant Dam and Donny Bridge.

4.1.1.4 Regulatory Requirements

A NOE (CEQA), CatEx (NEPA), Nationwide 5 (ACOE), LSAA 1600, CA collection permits, and other relevant permits have been obtained for this project.

4.1.1.5 PMT Decision

The decision to proceed with adult trapping will be dependent on the status of streamside facilities, water temperatures in Reach 1, and the probability of transported fish to survive. The PMT will advise staff on how to proceed based on conditions.

4.1.2 Transportation to Reach One

4.1.2.1 Action and Purpose

All transported fall Chinook, except those designated for use in streamside spawning will be placed in the San Joaquin River at Camp Pashayan upstream of the SR 99 Bridge (RM 243.5). Trapping and translocation will begin in October and end in December. However, due to drought conditions, trapping and translocation efforts may not begin until November and could extend through January. The number of fish expected to be trapped is between 50 and 130. These fish will be studied to provide information on survival rates, behavior spawning locations and success.

4.1.2.2 Roles and Responsibilities

Roles

Action Lead: Matt Bigelow (CDFW), Don Portz (BOR)

Participating Staff: DFW staff

Key Coordination Staff: Matt Bigelow (CDFW), Zachary Jackson (USFWS),Don Portz (BOR)

Responsibilities

Transport will be conducted by BOR and CDFW; carcass/redd surveys will be conducted by USFWS and CDFW; and streamside spawning will be conducted by CDFW.

4.1.2.3 Resources Needed

No additional resources are required to complete this task.

4.1.2.4 Regulatory Requirements

CDFW has a 1600 permit in place for the trapping, transportation, release, spawning and holding described above.

4.1.2.5 PMT Decision

None.

4.1.3 Monitoring of Adults in Reach One

4.1.3.1 Acoustic and Mobile Tracking

Action and Purpose

The purpose of mobile tracking is to monitor the movement of released fall-run Chinook salmon and to provide information about microhabitat use, spawning habitat selection and behavior of fall-run Chinook salmon in the Restoration Area. Migrating adults experience regulated river-specific processes that affect their survival. This monitoring effort will contribute to an understanding of these factors which are critical to devising effective recovery strategies.

Roles and Responsibilities

Roles

Action Lead: Zachary Jackson

Participating Staff: Jerrad Goodell, Crystal Castle, and Nathan Cullen, Matt Bigelow and CDFW field staff

Key Coordination Staff: Zachary Jackson (USFWS), Matt Bigelow (CDFW), Donald Portz (BOR)

Responsibilities

Zachary Jackson will:

- Coordinate mobile tracking of adult chinook
- Provide staff for conducting mobile tracking surveys
- Coordinate with trapping and transportation leads.

Matt Bigelow will:

- Coordinate the placement, monitoring and downloading of acoustic receivers

Resources Needed

No additional resources are required to complete this task.

PMT Decision

None.

4.1.3.2 Carcass and Redd Surveys

Action and Purpose

Visual surveys for carcasses, spawning adults, and redds will be conducted by a crew of four floating the river 2-3 days per weekafter adults have been transported to Reach 1. Surveys will be conducted from just below Friant Dam Donny Bridge. Surveys may be conducted up to 4 days per week with the survey reaches broken down to smaller sizes if deemed necessary by field crews.

Carcass Counts – Adult carcasses found during surveys will be enumerated, sexed, and females checked for spawning status (i.e. spawned or not spawned) and egg retention percentage. Carcasses will be examined for marks (fin clips and tags/telemetry units), with heads of adipose absent carcasses retained for coded-wire tag evaluation. Length measurements (i.e., length from postorbital to hypural plate) will be recorded and tissue samples (e.g., scales, otoliths, fins) obtained. Additionally, GPS locations of found carcasses will be recorded and caudal fins removed from processed fish to indicate the carcass has been sampled.

Redd Surveys – Redds found during surveys will be counted, marked, assessed (i.e., noting river velocity, substrate, position in river) and geo-referenced by GPS. Locations of adults encountered during surveys will be recorded with behavioral observations documented.

Egg Survival and Emergence – Up to 10 paired emergence traps will be place over naturally constructed redds approximately 2 weeks prior to anticipated emergence. Captured alevin will be counted, measured to the nearest millimeter fork length, and visually assessed for deformities or anomalies.

Redd Superimposition Monitoring – Redd grates will be placed over the tailspills of early spawning fish to evaluate whether redd grates could be an effective method to minimize redd superimposition. If redd grates are determined to be effective, they could be used in future years to protect spring-run redds from superimposition by fall-run spawners. Redd grates will be constructed of 3-foot pieces of reinforcing bar connected with plastic ties to form a triangle that will be anchored with cobble immediately over the egg pockets. Weekly surveys would be conducted to inspect and if necessary repair redd grates and evaluate whether the grates protect redds from late spawning fall-run. Redd grates would be assumed to be effective, if late spawners do not remove more than 3 inches of gravel from a grate-protected tailspill or bury a grate-protected tailspill with fine sediment.

Spawning and behavior data derived from carcass and redd surveys will provide information regarding spawning success, microhabitat utilization, and spawning habitat selection of Chinook salmon in the Restoration Area.

Roles and Responsibilities

Roles

Action Lead: Zachary Jackson (USFWS)

Participating Staff: CDFW and and Jerrad Goodell, Crystal Castle, and Nathan Cullen (USFWS)

Key Coordination Staff: Zachary Jackson (USFWS), Matt Bigelow (CDFW), Donald Portz (BOR)

Responsibilities

Zachary Jackson will:

- Coordinate all aspects of redd, carcass, and mobile tracking surveys and emergence trapping

Resources Needed

No additional resources identified.

Regulatory Requirements

All necessary permits have been obtained for this action.

PMT Decision

None.

4.1.3.4 Monitoring of Wild Juvenile Production

Action and Purpose

Wild juvenile production will be monitored through the use of screw traps located in key locations in the river. The purpose of the trapping effort is to gather information on abundance, species composition, size, run-timing and survival over time. More detail on monitoring methods is provided in Chapter 5.

4.2 Streamside Spawning

4.2.2 Spawning and Egg incubation

4.2.2.1 Action and Purpose

Trapped adults will be spawned and the eggs incubated in stream side incubators. The juveniles produced from this activity will be reared and released as part of study plans in the spring of 2014.

4.2.2.2 Roles and Responsibilities

Roles

Action Lead: Matt Bigelow (CDFW)

Participating Staff: CDFW staff

Key Coordination Staff: Matt Bigelow (CDFW) and Don Portz (BOR)

Responsibilities

CDFW staff will be responsible for conducting spawning activities in 2014.

4.2.2.3 Resources Needed

CDFW will provide incubation chambers and all supplies needed for the actual spawning.

4.2.2.4 Regulatory Requirements

CDFW has a 1600 in place for the trapping, transportation, release, spawning and holding described above.

4.2.2.5 PMT Decision

None.

4.2.3 Rearing

4.2.3.1 Action and Purpose

Offspring of streamside spawned fish will either be reared in net pens (after swim-up) in the restoration areas. The net-pen reared fish will provide a portion of the juveniles required for the restoration program.

4.2.3.2 Roles and Responsibilities

Roles

Action Lead: Matt Bigelow and Pat Ferguson (CDFW)

Participating Staff: Paul Adelizi (CDFW)

Key Coordination Staff: Matt Bigelow, Patrick Ferguson, Paul Adelizi (CDFW) and Zachary Jackson (USFWS)

Responsibilities

Matt Bigelow will:

- Provide staff and oversee streamside spawning, egg incubation, and rearing of juveniles.

4.2.3.3 Resources Needed

No additional resources are required to complete this task.

4.2.3.4 Regulatory Requirements

CDFW has a 1600 permit in place for the rearing of juvenile fall-run Chinook.

4.2.3.5 PMT Decision

None.

4.2.4 Release

4.2.4.1 Action and Purpose

Juvenile fish reared in net-pens will be released to the San Joaquin River in spring 2015. Fish releases will be coordinated with study efforts described in the 2015 MAP.

4.2.4.2 Roles and Responsibilities

Roles

Action Lead: Matt Bigelow, Pat Ferguson (CDFW)

Participating Staff: CDFW staff

Key Coordination Staff: Paul Adelizi (CDFW), Zachary Jackson (USFWS), Don Portz (BOR)

Responsibilities

CDFW staff will be responsible for the release of program fish from net pens

4.2.4.3 Resources Needed

No additional resources identified.

4.2.4.4 Regulatory Requirements

None.

4.2.4.5 PMT Decision

None.

4.2.5 Monitoring of Streamside Spawning Juvenile Production

4.2.5.1 Action and Purpose

Juveniles will be monitored both within the hatchery environment and after release into the San Joaquin River. The purpose of this monitoring is to determine survival, behavior, use of habitat during rearing and life history strategy.

Fish will be monitored using a combination of capture gear (RST's, seines) and tagging (CWT, PIT Tag and Acoustic Tag) technologies. These monitoring techniques are described in more detail in Chapter 5.

5.0 Monitoring Methodology

Many of the monitoring activities described in Chapters 3 and 4 will utilize the same methodology. These methods include the use of:

- Rotary Screw Traps
- Acoustic Tagging
- PIT Tagging

This Chapter provides a description of each of the methods, their purpose, parties responsible and resources and permits needed for their operation, decisions required by the PMT.

The information provided for each method is presented in sufficient detail to inform policy level discussions. The full range of monitoring activities and complete study plans will be described in the SJRRP's FY2014 Monitoring and Analysis Plan.

5.1 Rotary Screw Trapping

5.1.1 Action and Purpose

Protocols for Operation - RSTs will be placed in one to four locations (minimum of one location, maximum of four locations). To the extent possible, traps will be positioned in locations: (1) where a relatively high percentage of the total river discharge flows through the trap cone; (2) where they can operate effectively over the entire range of discharge conditions; (3) directly downstream of a riffle; and (4) in the thalweg of the river channel, unless high discharge or flood conditions dictate the trap should be moved to a position with lower water velocities. Accordingly, fish will be collected in reaches 1 and 2 of the Restoration Area with RSTs installed in the following general areas: near the SR 99 Bridge, Gravelly Ford, Chowchilla Bifurcation Structure, and just downstream of the San Mateo Road crossing the San Joaquin River (these are potential locations only and may change due to conditions, permitting or access and vandalism issues).

RSTs will be checked a minimum of once a day, but as often as necessary to maintain a safe holding condition for fish and efficient operation of the trap. The frequency of trap checks will ultimately depend on the number of fish collected, level of instream flow, and debris loads. If mortalities greater than 2 fish or 2% of total catch are observed in a given day due to high debris loads, the RST cone will be raised out of the water until conditions are better suited for survival of fish (i.e., reduced stream flow, improved weather conditions). If predation causes such mortality, a structural refuge will be installed inside the trap to reduce predation. The traps will be inspected daily for damage and improper wear to the cone, anchoring points, and overhead cable system. Field crews will checked the live-box and process any fish. The traps will be cleaned daily, with the cone, pontoons, and live-box being scrubbed and free of debris. Maintenance will be performed as inspections warrant such activities.

Data collected from captured juvenile Chinook Salmon will include fork length, weight, and smolt index score. Additionally, tissue samples of adipose present juveniles may be collected. Environmental data (water temperature, dissolved oxygen), will be collected with a multiparameter meter (i.e. Hydrolab, YSI). Water velocity and discharge will be recorded at each trap check or at the gauging station closest to the activity.

Efficiency releases will use marked fry-, parr-, and smolt-sized fall-run study fish over the entire range of flow conditions. Study fish will be tagged (CWT) and marked with brightly colored photonic dyes. Mark location/colors will not be used more frequently than every five days to ensure that release groups can be distinguished in trap captures. Marked study fish will be allowed to acclimate (i.e., at least 1 hour) to the river water before release by holding them in small net pens tethered to existing vegetation near the release site. Efficiency releases will be made gradually by drift boat in small groups (100-2000 fish) approximately 0.25 mile upstream from the trap just after dusk. Efficiency studies will be needed whenever the trap location is changed or the channel morphology changes at the study sites. Trap calibration may require up to 2,000 fish per release.

Juvenile Chinook Salmon captured in the downstream most RST will be loaded streamside into a transport tank using either dip nets or water filled vessels to carry them to the tank. The transport tank will be filled with water at ambient river temperature. Dissolved oxygen in the transport tank will be maintained at 8mg/L or above. Crews will begin each day by checking the upstream most RST first and working their way downstream, checking all RSTs. It is approximately 30 minute drive time between RST locations and just over an hour to the release site from the downstream most RST location near the San Mateo road crossing.

Disposition of mortalities - Chinook mortalities found in RSTs or those that may expire during transportation will be examined for disease and external injury caused by handling. Any mortalities in the RST will be measured, bagged in ethanol and kept for genetic assessment by the Program (PBT, etc.).

5.1.2 Roles and Responsibilities

Roles

Action Lead: Matt Bigelow and Patrick Ferguson (CDFW)

Participating Staff: CDFW field staff

Key Coordination Staff: Matt Bigelow (CDFW)

Responsibilities

Matt Bigelow and Patrick Ferguson will:

- Oversee installation of RST's
- Provide staff for operation of RST's and data collection.
- Provide protocols for operation of traps and data collection.

5.1.3 Resources Needed

CDFW has one operational 8 foot RST. Four staff available from CDFW and additional staff from USFWS or BOR if needed. The BOR has two RST's one 8 foot and one 5 foot available to the program.

5.1.4 Regulatory Requirements

A 5 year 1600 (Streambed alteration permit) has been issued (expiring in 2017) as well as a 5 year state lands lease with approval from ACOE. Prior to each RST study year an activity schedule is needed, being submitted to the Region 4 LSAA office along with any changes to locations or gear. No additional permitting is need, unless current RST locations change or new locations are added.

5.1.5 PMT Decision

None.

5.2 Acoustic Tagging and Recoveries Downstream of Restoration Area

5.2.1 Action and Purpose

Releases of tagged fish will occur below Friant Dam, and the lower connected reaches if flow is restored past Sack Dam. Additional releases directly above the mine pit complexes at Sycamore Island (RM 254), and Donny Bridge (RM243). Releases will also be made in Mendota Pool, and above Sack Dam. A minimum of 500 pilot fish will be released with each tagged fish release group. Up to 800 tagged fish will be released. Planning will include one early release scenario, with paired releases at Friant and in Reach 5 (or higher connected reach if possible). One late season release will also be planned with the same paired strategy. This will assist in comparing temperature/seasonal effects of fish movement and survival through the system.

Stationary receivers will be deployed in February throughout the Restoration Area. Key locations will be retained from previous years, but flexibility exists for other high priority locations. Stationary receivers will be downloaded 2 times during the life of any tags in the system, and mobile tracking will be conducted for a total of 5 days to be chosen based on release timing and recommendations of the group.

Data from downstream 180 kHz receivers farther than the confluence of the Stanislaus will be obtained from researchers outside the program (e.g., Pat Brandes USFWS, Josh Israel USBR).

To monitor movement of released fall-run Chinook salmon, 40 single-channel receivers capable of identifying coded acoustic transmitter tags will be strategically placed in the San Joaquin River between Friant Dam and the Merced River confluence. Receivers will be installed in February and retrieved in July. Receivers will be suspended vertically in the water column using a buoy and cement block, and anchored to the river bank using a stainless steel cable. In addition to stationary receivers, manual tracking (using a portable receiver) and visual observations will be conducted by with the redd and carcass survey crews.

5.2.2 Roles and Responsibilities

Roles

Action Lead: Zachary Jackson (USFWS)

Participating Staff: Jerrad Goodell, Crystal Castle, and Nathan Cullen (USFWS)

Key Coordination Staff: Zachary Jackson (USFWS), Jason Azat (CDFW)

Responsibilities

Coordination with downstream monitoring activities

5.2.3 Resources Needed

USFWS and BOR will purchase acoustic tags.

5.2.4 Regulatory Requirements

This study is permitted for a 5 year period beginning in 2011. We currently have valid: NOE (CEQA), CatEx (NEPA), Nationwide 5 (ACOE), NLAA and Internal Section 7 USFWS (ESA compliance), and a concurrence that it does not affect any Indian Trust Assests (ITA) under the programmatic document. Need to resubmit a Special Use Permit (SUP) for receiver placement in the San Luis Refuge Complex three weeks prior to proposed access, if river connectivity necessitates.

5.2.5 PMT Decision

None.

5.3 CWT Recoveries in Downstream Reaches, the Delta and Ocean

5.3.1 Action and Purpose

CWT recoveries of program fish will be obtained from other researchers working outside of the basin and through queries of the RMIS CWT Database (http://www.rmpc.org/). The purpose of this action is to determine fish distribution, survival rates and contribution to fisheries.

5.3.2 Roles and Responsibilities

Roles

Action Lead: John Netto (USFWS), Jason Azat (CDFW)

Participating Staff: John Netto (USFWS), Jason Azat (CDFW)

Key Coordination Staff: John Netto (USFWS), Jason Azat (CDFW)

Responsibilities

USFWS will query from the centralized database for any records of Program released fish.

5.3.3 Resources Needed

None.

5.3.4 Regulatory Requirements

None.

5.3.5 PMT Decision

None.