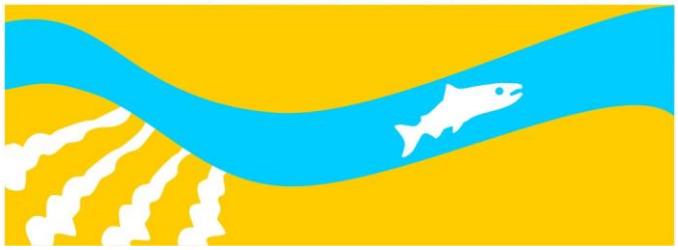
Study 46

Donor Stock Monitoring

Final
2015 Monitoring and Analysis Plan

SAN JOAQUIN RIVER
RESTORATION PROGRAM



January 2015

1.0 Donor Stock Monitoring

Theme(s):

- Fish reintroduction

Related Question(s): Questions not developed for this theme to date.

1.1 Statement of Need

This project would provide baseline population information essential for assessment of Butte Creek as a potential donor stock for the San Joaquin River Restoration Program (SJRRP), recovery and delisting of spring Chinook salmon, as well as direct and assess restoration actions on Butte Creek.

1.2 Background

A variety of methods have been used to evaluate relative abundance and temporal distribution of spring run Chinook salmon in potential donor streams over the years (e.g., rotary screw traps, carcass and snorkel surveys, video and hydroacoustic monitoring). Due to funding limitations, some potential donor stock streams (e.g., Butte Creek) are not currently implementing monitoring programs necessary to provide the information required by the Donor Stock Collection Work Group to develop collection requests.

Butte Creek currently has the largest of three sustaining populations of Central Valley spring Chinook salmon, the others being in nearby Deer and Mill creeks. Prior to listing under the Endangered Species Act (ESA) and California Endangered Species Act (CESA), population metrics and basic life history information for Butte Creek spring Chinook salmon will be extremely limited. The current study by the California Department of Fish and Wildlife (DFW), which began in 1995, will be initiated to provide a more comprehensive basis for directing and assessing restoration efforts for eventual recovery and delisting.

The potential Butte Creek donor population should be monitored and the collection of spring-run Chinook salmon for reintroduction in the SJRRP would be determined and authorized according to the results of the monitoring and through continuing discussion between the implementing agencies. At no time would collection exceed a level that has been determined to be beyond a threshold which the potential for additive loss to the Butte Creek donor population is likely to occur.

The first year of study occurred from January to June, 2013. However, historical sampling efforts in Butte Creek show that yearlings generally emigrate with the first

significant rain event of the fall season. Additionally, historical sampling efforts have documented fry emigrating as early as mid-November. In order to characterize the entire outmigration period and increase the likelihood of capturing yearling emigrants, Year 4 funding is requested for an expanded sampling period to include November and December.

1.3 Anticipated Outcomes

The study will result in several outcomes:

- Identify and monitor time of alevin emergence
- Monitor and document juvenile size at emigration
- Develop a measure of juvenile relative abundance
- Document rearing and emigration patterns

1.4 Methods

Type of Study: Field

Reach(es): Juvenile monitoring will be accomplished through operation of one rotary screw trap and one diversion fyke trap located at the Parrott-Phelan Diversion Dam southeast of Chico, California.

1.4.1 Butte Creek Trapping Sites

Trapping will occur at the Parrott-Phelan Diversion Dam (PPDD) location along Butte Creek. This site is directly downstream of the spring-run Chinook salmon (SRCS) spawning habitat and upstream of the fall-run Chinook salmon (FRCS) spawning habitat. The site will be sampled with a 2.4-meter diameter rotary screw trap (RST) manufactured by EG Solutions (Eugene, Oregon). The RST will be connected to an upstream stationary object, dam, weir, or fish ladder by use of 0.6 centimeter diameter steel cable. Placement will be adjusted regularly to allow for safe operation and access as well as to maximize the efficiency of sampling. In addition to the RST at PPDD, the diversion canal has an off-stream fish screen fitted with a trap box 1.2 meters x 0.9 meters x 2.1 meters. The PPDD traps will be fished 24 hours a day, seven days a week, except during extraordinarily high flows, periods of excessive debris or when migrating adults will be present in large numbers near the RST.

1.4.2 Physical Measurements

Three physical measurements will be recorded daily. Water velocity in meters per second (m/s) will be measured at the mouth of the RST cone with a Marsh-McBirney Flo-Mate, Model 2000. The velocity sensor will be attached to a graduated staff and submerged to a depth of 0.61 meter directly below the shaft of the screw trap cone. Each

velocity reading will be based upon a preset 45-second averaging period and recorded as the velocity reading for the entire 24 hour period. Additionally, RST cone revolutions will be recorded through the use of a mechanical counter (Reddington Counters Inc., Model 1-2936). Total revolutions for the 24 hour period will be recorded and the counter reset each day. Water temperature (Celsius) will be measured in the live box of each trap using a hand held Enviro-Safe Thermometer.

1.4.3 Processing Captured Fish

Daily, all fish will be netted from the trap live-boxes and immediately placed into a shallow tub of fresh river water. Juvenile Chinook salmon will be sorted from other species and swiftly transferred with small aquarium nets into buckets equipped with portable aerators to be transported to shore for processing. Juvenile Chinook salmon will be processed prior to any non-salmonid species. The first 10 of each non-salmonid species will be identified to species, measured to the nearest millimeter (mm) fork length (FL), and released. The remainder will be counted and released.

A random sub-sample of 50 salmon juveniles will be placed into a bucket containing a weak, standardized solution of Tricaine methane sulfonate (MS-222) and anaesthetized (10 grams (g) of MS-222 powder dissolved in 1 liter (L) of fresh distilled water to create a stock solution, which will be then used at a dilution of 40 milliliters (ml) stock solution added to 6 L of fresh river water). On immobilization, juveniles will be individually placed onto a wetted plexiglas measuring board and measured to the nearest mm FL. Salmon greater than 40 mm will be transferred to a wetted container on an Ohaus electronic scale and individually weighed to the nearest 0.01 g. Salmon not processed within the sub-sample will be hand counted to determine the total catch for the 24 hour sample period. When numbers of fish will be too high to hand count (>2,000), five-25 g (0.88-ounce (oz)) sub-samples will be weighed on an Ohaus electronic scale to the nearest 1.0 g (0.035 oz). The remaining fish will be then added to a previously weighed bucket of fresh water and then weighed to the nearest 25 g on a Chatillon hanging scale. The average number of fish per gram from the five weighed sub-samples will be then multiplied by the total grams from the hanging scale to provide an estimate for the total number of fish for the period.

1.4.4 Juvenile Emigration

By examining length frequency distributions of fish captured at PPDD, young-of-the-year (YOY) and yearlings can generally be identified. Yearling SRCS begin emigrating in the fall, approximately one year after egg deposition. These fish are the only salmon to emigrate before salmon from the newly spawned YOY emerge. Emigration of YOY SRCS is analyzed by examining catches of salmon trapped at PPDD.

1.4.5 Permits

This study is permitted by DFW Butte Creek staff. HACCP plans have been developed for this activity to ensure field staff does not spread invasive plants or animals among locations.

1.5 Deliverables and Schedule

This study will be implemented in November of 2015. Quarterly reports will be available January 31, April 30, and July 31, 2016 and the annual summary report will be available September 30, 2016. Information will be provided to the mid-year and annual technical reports as appropriate.

1.6 Budget

The total cost estimate is $54,411.24 for 2015.

Table 1-1. Proposed 2015 Budget

Task	Cost
Daily trap checks – staff time and consumables	$51,331.36
Overhead (6% for grants)	$3,079.88
Total	**$54,411.24**

1.7 Point of Contact / Agency Principal Investigator

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