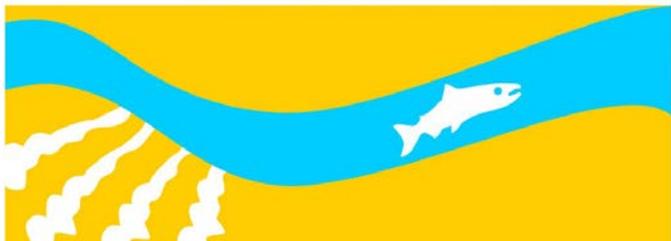


Juvenile Survival and Migration

August 2013

SAN JOAQUIN RIVER
RESTORATION PROGRAM



1.0 2013 Juvenile Salmonid Survival and Migration (Preliminary Report)

1.1 Introduction

The Fisheries Management Plan of the San Joaquin River Restoration Program (Program) (FMWG 2010) sets population goals for Chinook salmon (*Oncorhynchus tshawytscha*) to achieve the Restoration Goal for the Program. The Fisheries Implementation Plan (FIP) (FMWG 2010b) prioritized studies to address information needs to evaluate the Restoration Area for various fisheries needs. The FIP identified a study of juvenile salmonid migration and survival as a high priority for Interim Flows prior to the reintroduction of salmon, which is required by the Stipulation of Settlement by December 31, 2012 (NRDC vs. Rodgers 2006).

This study was designed to provide information of survival of juvenile Chinook salmon during their spring downstream migration through the restoration area. Stationary telemetry receivers were deployed to assess survival through mining pits, at unscreened diversions, and in both bypasses and the river channel in all available reaches (1-5) of the Restoration Area, as well as downstream past the lowest SJR tributary (the Stanislaus River).

Preliminary results of the third year of acoustic tracking of juvenile Chinook salmon are described in this report. At the time of submission, one final data download covering 2013 is still pending. These preliminary results do not include environmental data including temperature and flow data during the study period. A final report will be submitted in the December Monitoring and Assessment Plan that will incorporate the environmental variables.

1.2 Methods

1. **Receiver Deployment.** Receiver deployment was based on the following criteria: potential to address appropriate limiting factors (predation, entrainment, habitat), ability to access deployment sites, and risk of vandalism. Receivers were deployed at the locations outlined in Table 1 below. Receivers were cabled to existing woody vegetation and/or structures available on the bank using 3/8 inch stainless steel cable. Concrete block anchors were used to weight the receivers, buoys were cabled to the anchors on approximately 3 feet of cable. The receiver was attached to the cable using hose clamps and suspended in the water column.

Table 1. Receiver Locations for 2013 acoustic tracking of juvenile Chinook salmon through the SJRRP

Receiver Name	GPS Lat N	GPS Long W	Receiver Serial Number
Friant Dam UP	36 59' 51.3"	119 42' 26.7"	300723
Friant Dam DN	37 59' 49.6"	120 42' 27.5"	300713
Lost Lake Up	36 58' 50.2"	119 43' 49.4"	300720
Lost Lake Down	36 58' 47.8"	119 43' 52.7"	300575
Ledger Island Up	36 57' 14.9"	119 44' 17.3"	300730
Ledger Island Down	36 57' 13.8"	119 44' 12.7"	300724
Ball Ranch Up	36 56' 38"	119 44' 18.3"	300721
Ball Ranch Down	36 56' 37.4"	119 44' 19"	300718
Willow Unit Dn	36 56' 17.3"	119 44' 49.6"	300944
Willow Unit Up	36 56' 19.6"	119 44' 48.3"	300958
Cobb Up	36 53' 0.2"	119 47' 5.4"	300954
Cobb Down	36 52' 57.1"	119 47' 5.3"	300084
Vulcan Up	36 54' 36.3"	119 46' 27.6"	300728
Vulcan Down	36 54' 35.1"	119 46' 31.2"	300727
Scout Island UP	36 51' 28.07"	119 50' 17.54"	300712
Scout island DN	36 51' 30.61"	119 50' 18.97"	300558
Pashain Up	36 50' 55.4'	119 55' 31.3"	300729
Pashain Down	36 50' 41.8"	119 55' 47.3"	300714
Gravelly Ford Up	36 48' 6.37"	120 9' 3.84"	300574
Gravelly Ford Down	36 48' 1.47"	120 9' 9.91"	300154
Below Bifor Up	36 46' 14.6"	120 17' 30.7"	300717
Below Bifor Down	36 46' 18.9"	120 17' 31.6"	300560
Below San Mateo Up	36 47' 30.3"	120 20' 2.5"	300716
Below San Mateo Dn	36 47' 33.4"	120 20' 6.6"	300731
Mendota Pool S	36 47' 9.4"	120 21' 45.6"	300561
Mendota Pool N	36 47' 11.5"	120 21' 46.7"	300065
Fresno Slough E	36 46' 56.1"	120 22' 7.7"	300955
Fresno Slough W	36 46' 56.1"	120 22' 8.93"	300565
Mario ESB Up	37 16' 52.9"	120 49' 44.6"	300956
Mario ESB Down	37 16' 50.9"	120 49' 47.6"	300570
Hwy 140/165 Up	37 17' 35.9"	120 52' 36.5"	300719
Hwy 140/165 Down	37 17' 38.0"	120 52' 40.5"	300064
SJR US MR UP	37 19' 58.8"	120 57' 10"	300568
SJR US MR DN	37 19' 58.6"	120 57' 8.9"	300061
SJR DS MR US	37 21' 2.2"	120 58' 37"	300952
SJR DS MR DS	37 21' 5.2"	120 58' 37.25"	300715
SJR DS TUOL Up	37 36' 47.4"	121 10' 55.51"	300063 Lost Replaced with 300953
SJR DS TUOL Dn	37 36' 50.93"	121 10' 59.78"	300632
SJR DS STAN Up	37 40' 17"	121 14' 45"	300950
SJR DS STAN Dn	37 40' 14.14"	121 14' 45.50"	300062
RST	36 50' 37.42"	119 55' 56.33"	300957

- 2.
3. **Technology.** VEMCO VR2W-180khz receivers were used and in 2013, we used V-5 acoustic transmitters, replacing the V-6 transmitters used in 2011 and 2012. . VR2W-180 khz receivers have a detection range of approximately 75 m. V-6 tags weigh 0.5 grams in air and can be used on fish > 10.0g, to adhere to a maximum of 5% body weight tag burden (Adams et al 1998).
4. **Source Fish.** Juvenile fall run Chinook salmon from the Feather River Hatchery were used in this study. Feather River fall run are the earliest returning fall run and provided the best opportunity to get fish to the appropriate size for acoustic tracking at the earliest date. On March 18-20th, 2013 staff from the US Fish and Wildlife Service hand sorted, and coded wire tagged approximately 1750 fish

from the Feather River Hatchery raceways, and transported them to the holding pens in the San Joaquin River. The transport tank was filled with pumped water from the facility and temperature and dissolved oxygen were closely monitored. Dissolved oxygen was kept at or above saturation. Fish were transported from the Feather River facility to the San Joaquin Interim Conservation Facility located at the San Joaquin River Hatchery complex in a 500 gallon double-walled insulated aluminum tank. No mortalities were attributed to transport and handling stress.

5. **Surgery and Fish Release.** Fish were held in aluminum plate holding pens suspended using rotary screw trap pontoons in the pool below Friant Dam. Because no fish were large enough to support tag weight at the time of collection, fish were held until April 15th (weekly length/weight checks were conducted by CDFW staff to update us on size). On April 15th, the first fish were sorted and fish large enough were implanted with an acoustic tag. We continued this process of weekly checking, and tagging fish as they reached size until the last group was tagged on May 6th. (Table 1).

Table 1. Tag/Release Dates and Locations for 2013 Chinook Salmon Survival Studies in the SJRRP.

Tag Date	Release Date	Release Location	Number of Tagged Fish	Number of Pilot Fish	Temperature	Flow
4/16/2013	4/17/2013	Below Friant	47	200	11.8C	1060 cfs
4/16/2013	4/17/2013	Below Hwy 165 (REACH 5)	47	200	16.7C	150 cfs (Fremont Ford)
4/23/2013	4/24/2013	Below Friant	200	400	10.4C	1060 cfs
4/24/2013	4/25/2013	Below Friant	100	400	9.9C	1060 cfs
4/29/2013	4/30/2013	Below Friant	121	300	10.3C	1060 cfs
4/30/2013	5/1/2013	Below Friant	121	300	10.2C	1060 cfs
5/6/2013	5/7/2013	Below Friant	75	225	10.2C	500 cfs
Totals:			711	2025		

- 6.
7. **Receiver Downloads.** Deployed receivers recorded the identification number and time stamp from the coded acoustic transmitters as tagged fish traveled within the detection range, estimated to be 75 m. Data were downloaded monthly in the field using a wireless personal computer interface in May, June and July. Data collection is still ongoing.
8. **Mobile Tracking.** Mobile tracking was conducted during Predator Study sampling throughout the mine pit habitat. The river channel was also sampled on May 6, 7 from Friant Dam downstream through Reach 1.
9. **Data Summary.** Receiver downloads are not yet complete. Data will be summarized by release date and release location. Temperature and Flow during releases will be analyzed, as well as the development of survival rates and movement rates through the system.

1.3 Results – will be prepared for the December ATR

1.4 Discussion – December ATR

1.5 Conclusions and Recommendations- December ATR

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1.7 References

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