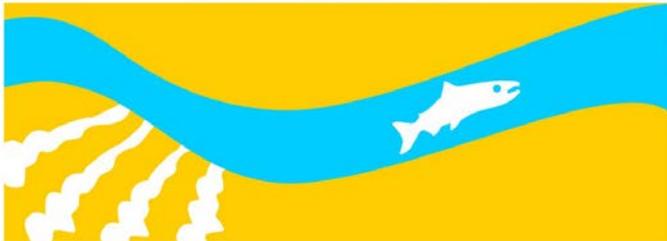


Study 11

Assessment of Predator Abundance and Distribution in Mine Pit Habitat in the San Joaquin River Restoration Area (ongoing)

Public Draft
2013 Monitoring and Analysis Plan

SAN JOAQUIN RIVER
RESTORATION PROGRAM



San Joaquin River Restoration Program

2013 Monitoring and Analysis Plan

Assessment of Predator Abundance and Distribution in Mine Pit Habitat in the San Joaquin River Restoration Area (ongoing)

Fisheries Management Work Group

Principal Investigator(s): Michelle Workman

Contact Info. Of Principal Investigator(s):michelle_workman@fws.gov

Proposed Staff: DFG Fresno (2); FWS Lodi (4)

County(ies) affected by Study: Fresno, Madera

I. Study Management

A. Study Description

1. History or Background

a. General project background discussion.

Fishery and aquatic resource assessments have been conducted by the California Department of Fish and Game from 2003-2005 as the first step in pre-restoration monitoring (2007). In 2012, initial surveys of captured mine pit habitat were conducted and will be reported out in the Fall Annual Technical Report. Predator presence data and species composition, are available from these studies.

Water temperature monitoring is currently being conducted by DFG. The water temperature monitoring is being developed to:

“collect sufficient data to develop and implement a systematic water temperature and meteorological monitoring scheme capable of fully describing the water temperature conditions likely to be experienced by all life stages of spring- and fall-run Chinook salmon in the San Joaquin River Restoration Area (Restoration Area)” (Guzman 2009)

It is recognized that these efforts will need to be supplemented by more intense monitoring levels in the mine pits and other potential predator habitats in order to assess these areas as predator

habitats and guide restoration actions that may include filling mine pits, closing breaches, or reducing residence times of water and fish through these habitats through restoration actions.

c. Why is the study necessary (context of settlement requirements, reintroduction efforts, interim flow information needs, etc.)?

There are two main information needs that will be addressed by continued study of predator abundance and distribution in the mine pit habitat on the San Joaquin River. One is that information on predator abundance and distribution is necessary to prioritize the mine pits for restoration from a biological perspective as required in the settlement. This is a multi-year study to develop the information to make assessments for restoration actions. Mine pit restoration is a Phase II action in the Stipulation of Settlement (NRDC v. USBR 2006). The second is that information regarding predator distribution throughout the Restoration Area will help guide decisions regarding the introduction of juvenile salmonids (locations, timing, etc.) into the San Joaquin River Restoration Area. The first year provides baseline data for continued study of predator/prey (e.g., stomach content analysis, acoustic tracking), and future expansion of study locations once salmonids are reintroduced to the Restoration Area. This information will also be critical to informing the Adaptive Management approach as described in the Fisheries Management Plan (FMWG 2009b).

The San Joaquin River has been impacted historically by in channel and floodplain sand and gravel mining leaving both off channel mine pits and captured mine pits in the channel. Many off channel pits have been breached and allow the river to run through them. Based on available data about 3.3 river miles have been directly impacted by mining actions (FWUA/NRDC 2002). Studies on the Tuolumne River have shown instream and captured gravel pits and the lentic habitat they create favor largemouth bass and predation losses in these habitats may be significant enough to affect populations of salmonids (TID/MID 1992 as cited in Stillwater 2003). Largemouth bass are adapted to high water temperatures and are commonly found in captured mine pits in the San Joaquin basin (FMWG 2009a, CDFG 2007).

Predation is recognized as a potential limiting factor for juvenile salmonids to be addressed during restoration actions in the San Joaquin River Restoration Program. The Restoration Area is known to harbor a number of likely predators on juvenile salmonids including largemouth bass (*Micropterus salmoides*), smallmouth bass (*M. dolomieu*), Sacramento pikeminnow (*Ptychocheilus grandis*), green sunfish (*Lepomis cyanellus*), warmouth (*L. gulosus*) black crappie (*Pomoxis nigromaculatus*) and striped bass (*Morone saxitalis*) (CDFG 2007). Predation risk below small dams, such as Sack Dam in the Restoration Area, has been well documented in other locales in the Central Valley, such as Woodbridge Irrigation District Dam (Workman 2006).

Actions identified to address predation as a limiting factor include filling the ‘highest priority’ mining pits, and reducing the number of predatory non-native fish (FMWG 2009b). The settlement agreement calls for reintroduction of salmonids to the restoration area by December 2012 (NRDC v USBR 2006). Prior to that time, assessment and management of predator populations will be necessary to achieve the population objectives outlined in the FMP (FMWG 2009b). The Fish Management Work Group has prioritized this proposal as medium-high due to the need to fill data gaps on predator populations and temperature regimes in captured mine pits for Phase II settlement actions of prioritizing mine pits for restoration (NRDC v. USBR 2006).

2. Site Description

There are 6 major complexes of captured mine pits from Friant Dam to Gravelly Ford. Each of these complexes will be considered one sampling site. These sampling locations are identified as:

1. First Set of Captured Mine Pits (Ft. Washington)– River Mile 257-256
2. Second Set of Captured Mine Pits (Sycamore Island Complex)– River Mile 254-252
3. Third Set of Captured Mine Pits (Milburn Unit) – RM 248
4. Fourth Set of Captured Mine Pits (Donnie Bridge)– River Mile 243-242
5. Fifth Set of Captured Mine Pits – River Mile 236
6. Sixth Set of Captured Mine Pits (Skaggs Bridge)– River Mile 233

At each sampling location a combination of boat electrofishing and trammel/gill netting will be used to sample for predator species. Individuals captured will be identified, weighed, measured, and tagged with an external tag that will provide individual identification (e.g., numbered floy tags). Gastric lavage will be used to collect diet information for predator species captured.

Each sampling location will be sampled 5 times over the late winter to late spring/early summer time period (mid-January to mid-June) to develop population estimates of predators.

Gastric Lavage (stomach pumping) will be conducted on no less than 20 fish per species per sampling location to assess the existing diet of appropriate sized predators (i.e., no predators that are too small to consume a salmon fry would be pumped). Diet information collected here will serve as baseline data to assess any dietary shifts that may occur related to reintroduction of salmon.

Vertical temperature strings will be placed in each sampling location to assess the physical habitat and its suitability to maintain predator populations annually. This activity will be covered under California Department of Fish and Game's temperature monitoring program.

As a new element of the 2013 study, stationary acoustic monitors and mobile tracking within the mine pits will be conducted in coordination with releases of tagged juvenile Chinook salmon to assess predator/prey interactions within the mine pits. Sampling predators will be timed with juvenile fish releases to determine predation impacts. Juvenile salmon will be released after dusk to minimize abnormal behavior that might increase the risk of predation.

2. Study purpose

a. Statement of study goals. To collect predator population data in the mine pit habitat and describe habitat characteristics to inform future actions regarding predator management and mine pit prioritization.

b. List the objectives of the study

1. Develop predator species distribution, richness and abundance estimates in the mine pit habitat in the Restoration Area
2. Determine if predator populations move across mine pits, or maintain resident populations within each mine pit.
3. Characterize the available predator habitat, temperature, depth, water clarity, etc. regime in existing mine pits in the Restoration area to assess predator habitat suitability and prioritize mine pits for restoration.
4. Use the above information to develop a prioritization ranking of existing mine pits for restoration actions.
5. Determine predation rates on tagged juvenile salmon.

c. Describe study milestones. Identify products and timelines.

Sampling will occur for one week each month January-June. Fish will be captured, tagged, released, with a portion taken for stomach analysis. Surface temperature, D.O. and turbidity will be measured at each sampling location during each sampling effort

Temperature loggers will be downloaded once each month and data summarized in the ATR report.

Bathymetry data has already been collected and will be used to describe habitat potential for predation.

Predator population parameters of : relative abundance, species richness, and size distribution will be summarized for each location, and each pit within each location.

Reporting will be done through the ATR process.

3. What are the management or policy implications of the study?

Prioritizing the mine pits for restoration is a Phase II action in the Settlement. Information gathered in this study will help address management decisions regarding restoring the highest priority pits based on their potential to increase predation risk to juvenile salmonids. Additionally, management decisions regarding appropriate release locations for juvenile salmonids can benefit from information gathered from this study. As with other fisheries studies, flow variability during the study period could complicate data analysis. Close coordination between flow scheduling and study implementation is important for study planning and analysis.

B. Study Organization and Responsibilities

1. Person(s) responsible (names, title, phone numbers, addresses, e-mail) and role.

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2. Chain of command (if appropriate).

3. Collaborators (agencies, NGOs, academia, etc.) and contact persons: California Department of Fish and Game, Matt Bigelow, mbigelow@dfg.ca.gov

4. Describe specific roles and responsibilities of all PIs on the project

Michelle Workman will coordinate field sampling crews and dates among FWS and DFG staff. DFG will provide temperature data management and secure access to sampling locations.

D. Study Resource Needs

1. Detailed budget

Equipment:

Ancillary equipment including cable, float weights, gill nets, etc \$5,000;
External tags for mark recapture for population and movement estimates \$1,200;
Stomach content analysis equipment (, alcohol, Nalgene, whirlpaks) to assess current diet and document diet change over time once reintroduction begins \$1,000.

Equipment subtotal = \$7,200

Equipment overhead = (6%)- \$ 432

Equipment Total: \$6,632

Staff time:

Bioday rate (this rate includes salary, benefits, administrative costs, use of vehicles, gasoline, office materials, etc; \$750 day for technical, \$900 day for senior staff)

20 biodays for 3 technical staff to e-fish pits, net and tag predators/recapture and pump stomachs- \$45,000;

Temporary Staff Subtotal = \$45,000

Temporary Staff overhead (25.5%)= \$11,475

Travel - 3 staff for 5 week = \$7,500

Staff Time (FTE): 0.10 FTE for oversight and coordination of study = \$23,693.60

Staff Total: \$87,668.60

Study Total: \$94,300.60

E. Compliance Considerations

1. Route study through FRRT for compliance considerations

Permits were obtained in year 1 for an anticipated 5 year study.

F. Invasive Species: What measures will be taken to ensure field staff does not spread invasive plants or animals to new sites during the study? (HACCP plans)

The FWS has HACCP plans associated with this study.

G. Due Dates and Products

1. **Describe the timeline for the study, with due dates for deliverables, Including drafts**

Draft and final reports to ATR including biological assessment of mine pit habitat for prioritization