Study 9

Fish Assemblage Inventory and Monitoring

Public Draft
2013 Monitoring and Analysis Plan

SAN JOAQUIN RIVER
RESTORATION PROGRAM

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San Joaquin River Restoration Program

2012 Monitoring and Analysis Plan

Fish Assemblage Inventory and Monitoring

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Proposed Staff: 4 Reclamation staff, 4 FWS staff, 4 DFG staff

County(ies) affected by Study: Fresno, Madera, Merced

I. Study Management

A. Study Description

1. History or Background

a. General project background discussion.

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 the CVP Friant Division Long-Term Contractors. After more than 18 years of litigation of this lawsuit, known as NRDC et al. v Kirk Rodgers, et al., a Settlement was reached. On September 13, 2006, the Settling Parties, including NRDC, Friant Water Users Authority, and the U.S. Departments of the Interior and Commerce, agreed on the terms and conditions of the Settlement, which was subsequently approved by the U.S. Eastern District Court of California on October 23, 2006. The Settlement establishes two primary goals: (1) Restoration Goal – To restore and maintain fish populations in "good condition" in the mainstem 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, and (2) Water Management Goal – To reduce or avoid adverse water supply impacts on all of the Friant Division long-term contractors that may result from the Interim Flows and Restoration Flows provided for in the Settlement.

The responses of Chinook salmon and other fishes to physical factors such as temperature, streamflow, climate change, and the impacts of various limiting factors are unknown (FMP 2010). Due to alterations to the San Joaquin River (SJR), a substantial amount of problems must be remedied to re-establish native fish populations. Approximately 21 native fish species historically inhabited the SJR. At least eight species are now uncommon, rare, extinct, or replaced by nonnative fish (FMP 2010). Existing data on fish species richness and diversity, standard

sampling techniques, and framework for long-term monitoring is important in measuring program success over time. Fish populations may take years to respond to management actions, initial findings will provide relevant information that could be used to adaptively manage future efforts for a more effective implementation of the restoration goal.

Fishery and aquatic resource assessments were conducted by the California Department of Fish and Game from 2003–2005 as the first step in pre-restoration monitoring (CDFG 2007). More standardized sampling protocols and more sampling sites are needed to assess changes in fish populations before, during, and after restoration activities. Standardized techniques and a framework for long-term monitoring need to be developed to measure program success over time.

The benefits of standardized sampling are that data are comparable over long time periods. Since fish populations can take years to respond to management actions, standardized time series data are critical for assessing these management actions (Bonar et al. 2009). In a non-wadeable stream, like the San Joaquin River, a number of gear types are required to maximize capture efficiency and to sample the entire assemblage of fishes. Typical gear types for river sampling include boat and backpack electrofishing, seining, trammel netting, and snorkeling. Standardized river sampling is often conducted on a reach scale, with reaches established to represent specific fish and habitat characteristics (Curry et al. 2009). The reaches of the San Joaquin River, as delineated in Chapter 2 of the Fisheries Management Plan (FMWG 2010) provide the basis to delineate standardized sampling protocols within each reach.

c. Why is the study necessary (context of settlement requirements, reintroduction efforts, interim flow information needs, etc.)? The Restoration Goal for the San Joaquin River Restoration Program is "To restore and maintain fish populations in "good condition" in the mainstem San Joaquin River below Friant Dam to the confluence with the Merced River, including naturally reproducing and self-sustaining populations of salmon and other fish." (NRDC v Rodgers et al., 2006). In order to assess achievement of this goal an inventory and monitoring program needs to be conducted to identify fish abundance and diversity within the restoration area. Describing a baseline fish assemblage within the restoration area during the beginning stages is important for long-term monitoring. Information on chronological analysis of the temporal and spatial distribution, relative abundance, and diversity of fish species will help with the Program's assessment of the restoration goal's success. This information can be use to adaptively manage future efforts for a more effective implementation of the restoration goal.

2. Site Description

a. Location of the study (include maps, geographic data, etc.). The study will occur over the entire Restoration Area (Friant Dam to the confluence with the Merced).

3. Study purpose

a. Statement of study goals To inventory and monitor fish communities throughout the Restoration as habitats are improved to meet the Restoration Goal and to collect fisheries data to better inform restoration/management decisions.

b. List the objectives of the study

1. Inventory and monitor fish communities within the five reaches of the Restoration Area to provide baseline data of fish assemblages present during quarterly field samplings.

2. Specific elements of physical and biological assessments of fish assemblages within the restoration area will be used to evaluate the long-term efforts of the Restoration Program.

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

Inventory and monitoring of the fish communities within the five reaches of the restoration area will be used to evaluate the long-term efforts of the Restoration Program. Information on chronological analysis of the temporal and spatial distribution, relative abundance, and diversity of fish species will help with the Program's assessment of the restoration goal's success. This information can be use to adaptively manage future efforts for a more effective implementation of the Restoration Goal.

B. Study Organization and Responsibilities

1. Person(s) responsible.

Don Portz: Project co-lead , project coordinator and Reclamation Project Manager including budgeting and staffing, landowner access, equipment ordering/preparation, study design and implementation, draft and final report preparation.

Michelle Workman: Project co-lead and coordinator of FWS staff. Responsibilities include budgeting and staffing, equipment ordering/preparation, study design and implementation, draft and final report preparation.

Matt Bigelow: Responsibilities include coordinating DFG staff for fisheries monitoring, management of field data and providing it to co-leads, DFG staffing, equipment ordering/preparation, budgeting and staffing, equipment ordering/preparation, and draft and final report preparation.

C. Study Design

1. Describe the sampling design and measurement variables.

Available major habitat types (run, riffle, pool, glide, off channel habitat) in each reach will be delineated from CDFG Mesohabitat monitoring. A representative subsample of each habitat type available will be sampled using the appropriate gear type.

a) Electrofishing will be used in appropriate habitats. Boat electrofishing can be used to sample large deep water areas such as captured mine pit habitats and deep glides, raft mounted elecrofishers can be used to sample habitats with moderate velocity and depth, and backpack electrofishing and block netting can be used for riffle habitats with shallow swift water.

b) Trammel and fyke nets will be used to sample habitats with low velocities or no flows. Trammel nets will also be used to drift for short durations (e.g., 20 min) on the main channel with higher flows. Results will be described as catch per unit effort (CPUE) of fish/m^2 of net. Trammel nets are advantageous and relatively efficient in turbid waters. For safety reasons, brightly colored floats will be used to attach to the head rope so boaters and other recreationists can avoid entanglement. While drifting, fisheries biologists tend the nets at close distances to reduce risk of entanglement and retrieve nets in short time intervals. Results will be described as CPUE of fish/m drifted transect.

c) Beach seining will be used to sample shallow water habitats with low velocities and channel bottoms conducive to successful deployment. An estimate of the surface area seined will also be recorded in order to analyze percentage of fish captured for each habitat. Results will be described as CPUE of fish/m^2 sampled.

All captured aquatic organisms, including invertebrate bycatch, will be identified (invertebrates maybe only identified to genus), recorded, measured (TL and FL), and weighed (g). Fish species captured will also be investigated by observation for physical health and morphological anomalies. Additionally, water quality parameters such as salinity (ppt), temperature (°C), turbidity (NTU), specific conductance (µS), and dissolved oxygen (mg/L) will be recorded at each sampling site. As well as general habitat type (e.g., riffle run, pool, glide, inundated floodplain, etc.).

2. Describe the contingency plans to assure the question is resolved and uncertainties are addressed:

Contingency planning will occur based on 1) changes in planned operations schedule, 2) issues with access, purchasing, equipment, staffing, etc. Because this is a long-term data set and it is done seasonally, adjustments can be made within the season for sampling if complications arise.

D. Study Resource Needs

1. Detailed budget

	Estimated Costs
Field work and monitoring (Base Amount):	
Reclamation	
4 Reclamation fisheries biologists ($736/day/biologist) (14 days each quarter March, June, September, & December)	$ 164,864
2 weeks data entry	$ 7,360
Report writing (1 biologist, 4 weeks)	$14,720
Travel (airfare, lodging, per diem, truck, fuel, parking, etc.)	$ 58,220
SJRRP meeting attendance	$ 1,472
FWS	
4 FWS fisheries biologists($750/day technical, $900/day biologist) (10 days each quarter March, June, September, & December)	$ 132,000
2 weeks data entry	$ 7,500
Report writing (1 biologist 4 weeks)	$18,000
Travel (lodging, per diem)	$ 16,360
FWS Staff overhead (25.5% for outside CVPIA)	$ 40,851
SJRRP meeting attendance	$ 2,700
DFG	
4 DFG staff costs not included in this proposal	
Report writing (1 biologist, 4 weeks)	
SJRRP meeting attendance	
Sampling Method: Electrofishing	
Field monitoring for option covered under base amount above	*included above*
Data analysis (2 biologist @ 5 days)	$ 2,944
Raft Electroshocker (with outboard and trailer)	no cost
Backpack Elecroshockers	no cost
Supplies:	
Electrofishing nets	supplied
Miscellaneous	$ 2,000

Sampling Method B: Trammel Nets

Field monitoring for option covered under base amount above	*included above*
Data analysis (1 biologist @ 4 days)	$ 2,944
Trammel Nets ($500 each × 10)	$ 5,000
Float rope, lead line, anchors and floats	$ 1,350
Miscellaneous	$ 2,000
Installation (8 days × 3 biologists)	$ 19,200
Acquisitions	$ 1,000

Sampling Method C: Beach Seining

Field monitoring for option covered under base amount above	*included above*
Data analysis (1 biologist @ 4 days)	$ 2,944
Beach Seines (30'- $121 and 50' – $250)	$ 371
Miscellaneous (zipties, poles, floats, lead lines, etc.)	$ 500

Grand Total	$ 504,300

E. Compliance Considerations

1. Compliance considerations

A NOE (CEQA), CatEx (NEPA), Nationwide 5 (ACOE), NLAA, and Internal Section 7 FWS (ESA compliance), CA collection permits, and other relevant permits will be obtained before starting this study. A Special Use Permit (SUP) for access to the San Luis Refuge Complex will be requested three weeks prior to proposed access, if river connectivity necessitates.

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 were developed for this activity for aquatic nuisance species.

G. Due Dates and Products

1. **Describe the timeline for the study, with due dates for deliverables, Including drafts (this should relate to section I.A.2.c).**

Final and Draft Reports submitted to the Annual Technical Report.