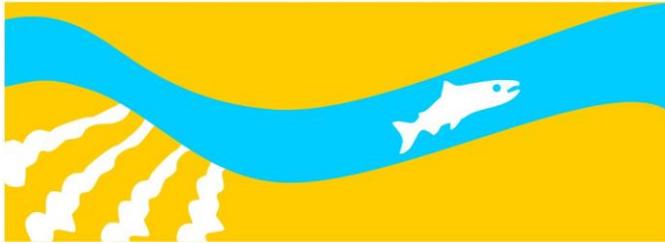


Study 23

Vegetation Monitoring

**Final
2015 Monitoring and Analysis Plan**

**SAN JOAQUIN RIVER
RESTORATION PROGRAM**



1 Vegetation Monitoring

1.1 Statement of Need

The SJRRP Vegetation Monitoring Study will evaluate the establishment and development of riparian vegetation in response to Restoration Flows within the SJRRP Restoration Area.

1.2 Background

Friant Dam operations, agricultural development, and construction, and operations and maintenance (O&M) of the flood control system modified riparian vegetation adjacent to the San Joaquin River. In Water Year (WY) 2010, SJRRP began releasing water, which rewetted several dry portions of channel and contributed to near-river groundwater.

Vegetation is a component for management of the following:

- **Riparian Habitat** – Establishment of riparian habitat along the San Joaquin River will be a key step in successful fish reintroduction (SJRRP, 2010). In-channel and floodplain habitat support fish at multiple life stages by providing shade to maintain suitable water temperatures, shelter for juveniles to avoid predation, and input of terrestrial food sources.
- **Channel Capacity** – Vegetation growth may affect water surface elevations and corresponding shallow groundwater levels.
- **Flood Control** – The change in river operations and potential for changed vegetation raises concerns for long-term O&M needs to maintain flood control capacity throughout the system.

From 1999 through 2002 the Friant Water Users Authority (FWUA) conducted a pilot project on the San Joaquin River to investigate the response of vegetation and groundwater to the limited flows being released from Friant Dam (FWUA, 2001). The monitoring included 13 groundwater wells and vegetation monitoring at 12 transects in Reach 2A and one transect in Reach 2B. Mortality could not be discerned from the pilot project because the transects were located in an area where the Lower San Joaquin Levee District conducted vegetation management activities. Another limitation of the pilot project is that the transects occurred in a relatively small portion of the Restoration Area now affected by Restoration Flows.

The SJRRP Physical Monitoring and Management Plan (2011) describes vegetation surveys to obtain information on the establishment and recruitment of vegetation.

Information gained through surveys would inform future actions related to fisheries habitat establishment, channel capacity management, and flood control system O&M needs.

1.3 Anticipated Outcomes

The following are the anticipated outcomes:

- Provide riparian vegetation recruitment and survival data to inform Friant Dam flow scheduling
- Detect spread of invasive species which inhibit establishment of native vegetation
- Understand how changes in vegetation may affect O&M needs to maintain flood control capacity

1.4 Methods

SJRRP would continue to monitor approximately 20 vegetation monitoring transects in the Restoration Area (Reaches 1 through 5, Eastside Bypass, Mariposa Bypass) and the Chowchilla Bypass. Transects would be monitored annually, and added/decommissioned according to information needs. Transects would be established by pounding T-posts approximately 12 inches into the ground. During monitoring activities, a tape would be temporarily installed between transects. The monitoring would include no ground-disturbing activities in addition to installation of T-posts.

Plant cover, composition, height, and stem density will be collected annually along transects established in the riparian corridor. Transects would be established where access is permitted and located near existing groundwater monitoring wells to the greatest extent possible. Piezometers may be installed to expand the existing groundwater network where needed and approved. Groundwater data from these wells and flow/discharge data will be used to investigate correlations between growth and development of vegetation and water table levels.

For herbaceous understory measurements, cover and species composition will be measured every 0.5 meter along the transect. The point-intercept method will be used, which entails recording the first “hit” for herbaceous plants by species and for woody species under 1.5 meters tall. If a plant is not intercepted, then bare soil or litter are recorded. The location and extent of invasive weed species will be documented when encountered.

The line-intercept method will be used for measuring woody overstory cover. Overstory cover will be measured along the transect by noting the point along the tape where the canopy begins and the point at which it ends for each woody species over 1.5 meters tall. The height of overstory vegetation will also be collected. Woody stem density will be

determined by using a meter stick to measure 1 meter outward on one side of the transect. All woody stems within the 1-meter belt transect will be counted, regardless of size.

Vegetation monitoring data will be statistically compared over time to evaluate significant changes in vegetation. Photos will be taken at each end of the transects during every monitoring period to visually document vegetation height, density, species composition, and general site development over time.

A qualitative geomorphic site characterization will be conducted at each site and topographic surveys of the vegetation transects will be performed on an annual basis to tie potential changes in vegetation to fluvial processes.

1.5 Deliverables

A draft study plan will be available for public review annually in early October in the public draft SJRRP MAP. The MAP is finalized each year in late November and contains study plans for the next year of the SJRRP. Data and a report of the previous year's monitoring will be available in the SJRRP Annual Technical Report (ATR) each April. The first-year report will present baseline data and the second-year report will include comparisons in the vegetation parameters measured between the 2 years of data collection. Data from previous monitoring efforts will also be included in comparisons, if available. After 2 years of data collection, SJRRP will conduct a review to determine if the objectives have been met or if additional monitoring data should be collected.

1.6 Schedule

There will be five days of monitoring between June and August, depending on flow conditions.

1.7 Budget

The following table shows lists the estimated costs associated with this study.

Table 1-1. Proposed 2015 Budget

Task List	Staff Day Cost (\$) for SL1 (\$552/day)	Staff Day Cost (\$) for SL2 (\$760/day)	Staff Day Cost (\$) for SL3 (\$936/day)	Staff Day Costs Total (\$)	Non-Labor Costs (\$)	Notes
Program Office monitoring & coordination support	0	11,400	2,808	14,208	1,000	Travel from Sacramento and 1 week monitoring trip
Vegetation Monitoring	0	31,920	16,848	46,768	11,900	-
Reporting	0	0	0	0	0	-
Totals	-	-	-	62,976	12,900	-

1.8 Point of Contact/Agency

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1.9 References

Friant Water Users Authority (FWUA). 2001. San Joaquin River Riparian Habitat Restoration Program 2001 Pilot Project.

FWUA. *See* Friant Water Users Authority.

San Joaquin River Restoration Program (SJRRP). 2010. Fisheries Management Plan: A Framework for Adaptive Management in the San Joaquin River Restoration Program. Appendix E. Draft Program Environmental Impact Statement/Report. November 2010.

———. 2011. Draft Program Environmental Impact Statement/Environmental Impact Report. Appendix D – Physical Monitoring and Management Plan. Part 1. April.

SJRRP. *See* San Joaquin River Restoration Program.