UNITIED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

MID-PACIFIC REGION

SOUTH-CENTRAL CALIFORNIA AREA OFFICE
FRESNO, CALIFORNIA

DRAFT FINDING OF NO SIGNIFICANT IMPACT

INSTALLATION AND REHABILITATION OF STREAM GAGES ON THE SAN JOAQUIN RIVER, FRESNO AND MADERA COUNTIES, CALIFORNIA

Central Valley Project
Sacramento, California

FONSI-07-130

Recommended by:

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INSTALLATION AND REHABILITATION OF STREAM GAGES ON THE SAN JOAQUIN RIVER, FRESNO AND MADERA COUNTIES, CALIFORNIA

In accordance with Section 102 (2) (c) of the National Environmental Policy Act (NEPA) of 1969, as amended, and the Council on Environmental Quality's Regulations for Implementing the Procedural Provisions of NEPA (40 CFR Parts 1500-1508), the South-Central California Area Office of the Bureau of Reclamation (Reclamation) finds that the proposed action would not significantly affect the quality of the human environment. Therefore, an Environmental Impact Statement is not required for the proposed installation and rehabilitation of stream gages on the San Joaquin River in Madera and Fresno Counties. This Finding of No Significant Impacts (FONSI) is supported by the attached environmental Assessment, (EA) *Installation and Rehabilitation of Stream Gages on the San Joaquin River, Madera and Fresno Counties, California* (EA-07-130).

PROPOSED ACTION

Reclamation proposes to rehabilitate and retrofit the existing stream gage stations at the bifurcation structure and below Sack Dam on the San Joaquin River, and to install two new monitoring stations at the top of Reach 4B and one at the confluence of the Merced and San Joaquin Rivers.

The San Joaquin River litigation settlement requires that interim flows for experimental purposes start in October 2009. The flows would be increased gradually over the next several years, with the goal of reintroducing salmon by December 31, 2012. Prior to project implementation, a sufficient amount of planning must be completed and data must be collected to prepare for the interim and eventually the full restoration flows in the River. In addition, the settlement agreement requires that restoration flows be measured at various locations between Friant Dam and the Merced River.

The project is needed for the measurement, monitoring, and reporting of current flows and potential flood flows on the San Joaquin River, as well as to meet the settlement agreement requirements for the measurement of restoration flows. The stream gage stations will supply timely real time flood management information necessary for protecting life and property, in addition to providing San Joaquin River real-time water quality data, which is essential for San Joaquin River and Delta water quality modeling efforts.

FINDINGS

Water Resources and Water Quality

Reclamation's releases to the river would not be changed by implementation of the proposed action. The proposed action would not affect the amount of flow or change the water quality in the river. Therefore, there will be no significant impacts on water resources or water quality.

Land Use

There will be no changes to land use from the proposed action. As a result, there will be no significant impacts to land use.

Biological Resources/Threatened and Endangered Species

The installation of three gages and rehabilitation of two others would result in some minor ground disturbance, very minor loss of open space (i.e. from concrete pad installation) and some generation of noise. However, because these effects are negligible and on site best management practices and mitigation measures will be taken, the effects of the ground disturbance, minor loss of open space and generation of noise on biological resources will not be significant.

No impacts would occur on federally listed species, on critical habitat, or on essential fish habitat. Avoidance measures would prevent impacts on the arid-adapted species, such as the San Joaquin kit fox, which have a very low chance of occurring in the project area to begin with.

The giant garter snake would only be affected by water hyacinth removal at the top of Reach 4B, but based on the field visit findings and inspection of aerial photos and hydrological features, this site does not have connectivity to occupied giant garter snake habitat. Thus, the species is not expected to occur at this site and would therefore not be affected.

Construction at the Merced confluence gage will be done during summer months to avoid the possibility of steelhead presence. Also, prefabricated concrete anchors will be used, so that no fresh concrete can come in contact with water. Thus, the species is not expected to occur at this site and would therefore not be affected. Essential fish habitat for fall-run and late fall-run Chinook salmon does not occur in the project area, because the work site at the Merced confluence is actually upstream of the exact confluence, which is the upstream limit for essential fish habitat on the San Joaquin River. Salmonids can only move upstream of the confluence with the Merced River during cooler wet months, when the Hills Ferry Barrier is removed every December. However, since construction would occur during summer months and/or construction would be limited to periods when there is no hydrologic connection between Sack Dam and the lower reaches of the San Joaquin River and there is no possibility of salmonid presence. Thus, these species is not expected to occur at the sites and would therefore not be affected.

Several other special-status species are expected to occur in the project area and would experience some minor effects. The measures incorporated into the project will reduce these effects and prevent any violations of the Migratory Bird Treaty Act and Bald and Golden Eagle Protection Act. These other special-status species are: the western pond turtle, Golden Eagle, Western Burrowing Owl, Red-tailed Hawk, Swainson's Hawk, Northern Harrier, White-tailed Kite, Bald Eagle, Bank Swallow and San Joaquin pocket mouse.

Based on the above discussions and the mitigation measures outlined in the EA, there will be no significant effects to threatened or endangered species or their designated critical habitat.

Cultural Resources

The use of the existing stations has no potential to affect historic properties pursuant to the regulations at 36 CFR Part 800.3(a)(1). The stations that will be retrofitted with new equipment

will simply involve the installation of new data collection equipment and will not result in excavation, trenching, or modification of any historic structures and as a result will have no potential to affect historic properties pursuant to 36 CFR Part 800.3(a)(1). The construction of the three new stations will be done within existing waterways and significantly disturbed contexts resulting in no potential to affect historic properties pursuant to 36 CFR Part 800.3(a)(1).

Because three elements of the proposed action will have no potential to affect historic properties, there will be no significant impacts to cultural resources as a result of implementing the proposed action.

Indian Trust Assets

The proposed action does not involve Indian Trust Assets. The nearest ITA is Table Mt. Rancheria, which is approximately 7 miles NE of Friant Dam, therefore the proposed action will not significantly affect Indian Trust Assets.

Environmental Justice

This assessment did not identify any adverse or beneficial effects of the proposed action unique to minority or low-income populations in the affected area. Therefore, the proposed action will have no significant effects on minority or low-income populations.

Cumulative Effects

The implementation of the SJRRP is a reasonably foreseeable action related to the proposed action. However, the significant impacts of the SJRRP on the environment would not increase when cumulatively considering the proposed action. A Program Environmental Impact Statement/Environmental Impact Report is currently being developed to examine impacts of the entire river restoration program. All impacts, as well as cumulative ones, will be described and examined in that document.

RECLAMATION

Managing Water in the West

Draft Environmental Assessment

Installation and Rehabilitation of Stream Gages on the San Joaquin River, Fresno and Madera Counties, California

EA-07-130

U.S. Department of the Interior
Bureau of Reclamation
Mid Pacific Region
South Central California Area Office
Fresno, California

October 2008

Mission Statements

The mission of the Department of the Interior is to protect and provide access to our Nation's natural and cultural heritage and honor our trust responsibilities to Indian Tribes and our commitments to island communities.

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

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List of Tables and Figures

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List of Acronyms and Abbreviations

CDEC	California Data Exchange Center
cfs	cubic feet per second
CVP	Central Valley Project
CVPIA	Central Valley Project Improvement Act
DFG	California Department of Fish and Game
DWR	California Department of Water Resources
EC	Electroconductivity
ESA	Endangered Species Act
FWCA	Fish and Wildlife Coordination Act
FWS	U. S. Fish and Wildlife Service
FWUA	Friant Water Users Authority
GOES	Geostationary Orbit Environmental Satellite
ITA	Indian Trust Asset
MPR	Mid Pacific Region
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NRDC	Natural Resources Defense Council
PVC	Polyvinylchloride
Reclamation	Bureau of Reclamation
RM	River Mile
SCCAO	South-Central California Area Office
SHPO	State Historic Preservation Office
SJR	San Joaquin River
SJRRP	San Joaquin River Restoration Program
SJRWQMP	San Joaquin River Water Quality Management Program
SWP	State Water Project
TDS	Total Dissolved Solids
USGS	U. S. Geological Survey

Section 1 Purpose and Need for Action

1.1 Background

In 1988, a coalition of environmental groups, led by the Natural Resources Defense Council (NRDC), filed a lawsuit challenging the renewal of the long-term water service contracts between the United States and the Central Valley Project (CVP), Friant Division 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 reached agreement on the terms and conditions of the Settlement, which was subsequently approved by the Court on October 23, 2006. The "Settling Parties" include the NRDC, Friant Water Users Authority (FWUA), and the U.S. Departments of the Interior and Commerce.

The San Joaquin River Restoration Program (SJRRP) will implement the San Joaquin River litigation Settlement (settlement agreement). The "implementing agencies" responsible for the management of the SJRRP include the United States Department of Interior, through the Bureau of Reclamation (Reclamation) and the Fish and Wildlife Service (FWS), United States Department of Commerce through the National Marine Fisheries Service (NMFS), and the State of California through the Department of Water Resources (DWR) and the Department of Fish and Game (DFG).

The settlement agreement requires that interim flows for experimental purposes start in October 2009. The flows would be increased gradually over the next several years, with the goal of reintroducing salmon by December 31, 2012. Prior to project implementation, a sufficient amount of planning must be completed and data must be collected to prepare for the interim and eventually the full restoration flows in the River. In addition, the settlement agreement requires that restoration flows be measured at various locations between Friant Dam and the Merced River.

1.2 Purpose and Need

The project is needed for the measurement, monitoring, and reporting of current flows and potential flood flows on the San Joaquin River, as well as to meet the settlement agreement requirements for the measurement of restoration flows. The gage stations would be able to supply timely real time flood management information necessary for protecting life and property, in addition to providing San Joaquin River real-time water quality data, which is essential for San Joaquin River and Delta water quality modeling efforts.

Based on the data needed, six locations between Friant Dam and the Merced River have been identified for measuring and are consistent with the settlement agreement measurement requirements. The locations are summarized in Table 1 and shown on Figure 1. Flows would be measured using existing stream gages where possible. Where existing gages are not available or are inadequate to measure flows, new gages would need to be installed or in some cases formerly used gages would be retrofitted to measure the flows.

Publicly available, high quality, continuous stream flow data is critical for demonstrating compliance with the provisions of the settlement agreement. Stream flow data will be essential for computing a water balance for the restoration flows, verifying assumptions made regarding the hydrographs contained in "Exhibit B" of the settlement agreement, and for planning and evaluating a wide variety of restoration projects. The San Joaquin River Restoration Program will have limited success in predicting, implementing, and evaluating the effects of restoration actions on the fish, wildlife and water resources of the San Joaquin River without reliable, high quality stream flow data.

Table 1: Flow monitoring locations.

Site	Location	Existing Station	Agency	Parameters	Remarks
1	Friant Dam	Yes	Reclamation	Flow, EC, Temp., others	Flows would be measured at Friant Dam outlets.
2	Gravelly Ford	Yes	Reclamation	Flow, EC, Temp., others	Existing gage adequate to measure flows.
3	Below Chowchilla Bifurcation Structure	Yes	Reclamation	Flow, EC, Temp.,others	Existing gage would be retrofitted to measure flows.
4	Below Sack Dam	No	DWR	Flow, EC, Temp., others	Abandoned (Dos Palos) stream gage would be retrofitted.
5	Top of Reach 4B	No	DWR	Flow, EC, Temp., others	A new stream gage would be established.
6	Merced River Confluence	Yes, but not adequate	USGS/ Reclamation	Flow, EC, Temp., others	A new stream gage would be established

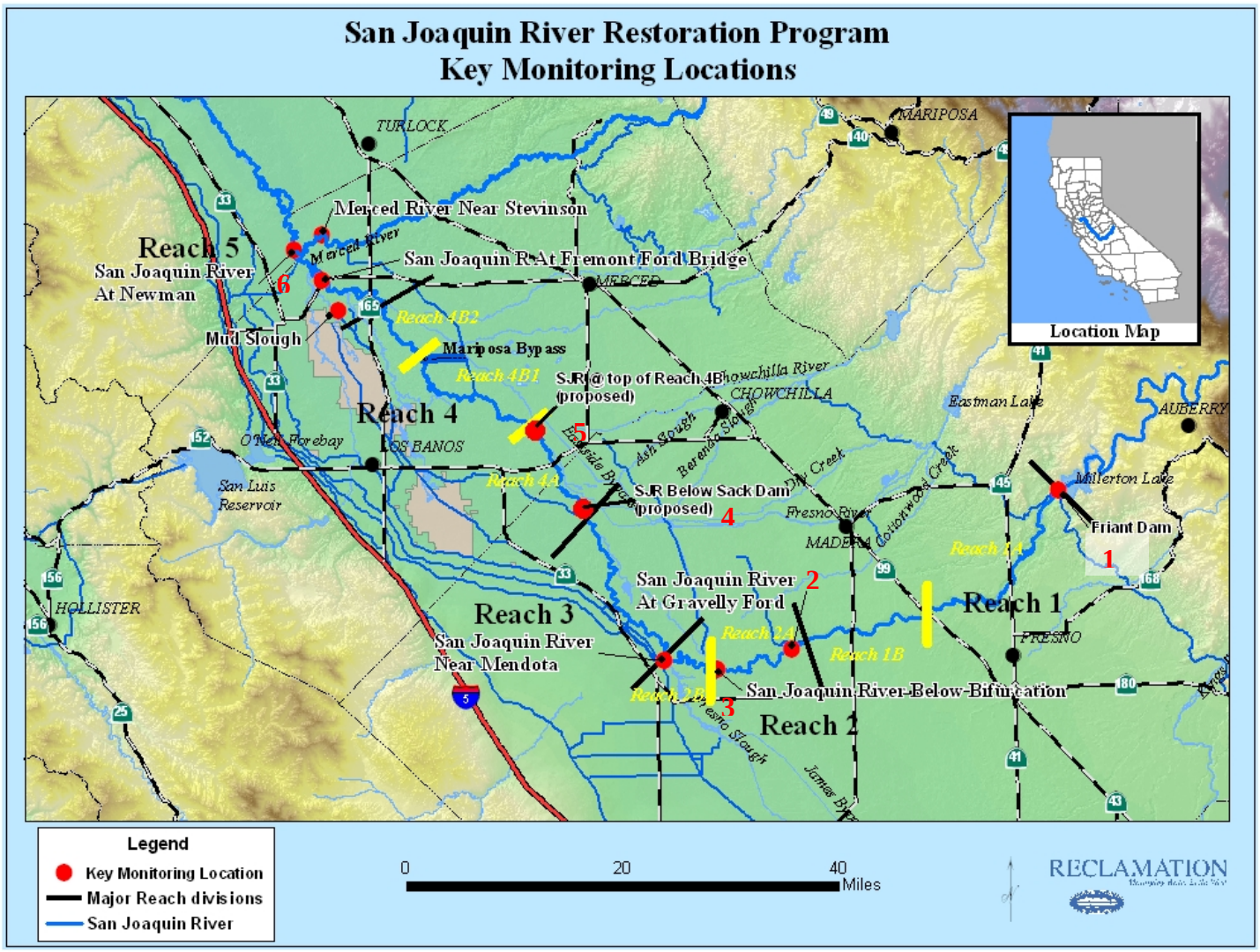


Figure 1: Map of Flow Monitoring Locations.

The existing flow monitoring stations at sites 1 and 2 are adequate for the monitoring and measuring requirements. However, the flow monitoring stations at site 3 and site 4 need to be retrofitted, and there are no existing flow monitoring stations at site 5. There are several monitoring stations in the general area of the confluence of the Merced River (site 6). However, after further evaluations, it has been determined that none are adequate and in the correct location. Therefore, a new gage station would be needed.

1.3 Scope

The scope of this project is limited to the rehabilitation and retrofitting of the existing stations at the bifurcation structure (site 3) and below Sack Dam (site 4), and the installation of two new monitoring stations at the top of Reach 4B (site 5) and one at the confluence of the Merced and San Joaquin Rivers (site 6).

1.4 Potential Issues

The potentially affected resources in the project vicinity include:

- Water Resources
- Land Use
- Biological Resources
- Cultural Resources
- Indian Trusts Assets
- Environmental Justice

Section 2 Alternatives Including the Proposed Action

2.1 Alternative A: No Action

Reclamation and DWR would not install or rehabilitate the monitoring stations. Because project planning is dependent on the data collected from the monitoring stations, failure to collect data on the River would hinder SJRRP implementation. Without monitoring of flows, Reclamation would not be able to adequately prepare for the interim and restoration flows, nor for compliance with the provisions of the settlement agreement. The SJRRP would have limited success in predicting, implementing, and evaluating the effects of restoration actions on the fish, wildlife and water resources of the San Joaquin River without reliable, high quality stream flow data.

2.2 Alternative B: Proposed Action

Reclamation and DWR propose to retrofit the existing stations below the Chowchilla bifurcation structure and below Sack Dam, and to install two new monitoring stations at the top of Reach 4B and one at the confluence of the Merced and San Joaquin Rivers. Prior to project implementation the following permits would be required:

- Army Corps of Engineers – Nationwide Permit for stream gages
- DFG – Streambed Alteration Permit
- CA Regional Water Quality Control Board – 401 Water Quality Certification

In order to reduce the project's potential impact to below significant levels mitigation measures that will avoid, minimize, and/or rectify potential impacts will be incorporated into the project. The following on-site mitigation measures will reduce the project impacts to biological resources to less than significant. Table 2 discusses each sensitive species by potential for occurrence in the project area and potential project impact(s).

<u>On-Site Mitigation Measures</u>

1. All activities will be implemented in coordination with protection, avoidance, and/or minimal impacts of existing habitats.

2. All activities will be completed in a timely manner.

3. All on-site personnel will be given written and oral instructions to avoid impacts and be made aware of ecological values of the sites. A fact sheet covering this information will be distributed to all personnel who will work at the sites or occasionally visit the site or deliver materials. Biologists shall conduct an educational environmental training session (tailgate training session) for all onsite personnel. The program shall consist of a brief presentation explaining listed species concerns to include:

A. A description and photograph of each of the sensitive species and their habitat needs.

B. An explanation of the status of these species during project construction and implementation.

C. A discussion of the protection measures that would be implemented to reduce impacts to the species during project construction and implementation.

4. Before staging, installation, or operations and maintenance activities, a qualified wildlife biologist will survey the project area for potential dens and other San Joaquin kit fox sign, such as scat, prey remains, and tracks. The biologist shall follow the USFWS's Standard Recommendations for the Protection of the San Joaquin kit fox Prior to or During Ground Disturbance (USFWS 1999). If known, active and/or natal San Joaquin kit fox dens or blunt-nosed leopard lizards are observed, the project site will be moved to avoid any potential project-related impacts to listed species and operations and maintenance activities will cease.

5. Preconstruction surveys by a qualified wildlife biologist shall be performed in and around the project area for potential burrows occupied by burrowing owls (*Athene cunicularia*).

6. A DWR biological monitor will be on-site at all times during installation and operations and maintenance activities. The monitor will check the site prior to the start of any activities for sensitive wildlife or plants; assist in avoiding impacts to wildlife and habitats; determine the least damaging options for removal or transplantation of vegetation according to established protocols; and provide technical information.

7. Project-related vehicles shall observe a 20 MPH speed limit in all project areas, except on county roads and State and federal highways; this is particularly important at night when San Joaquin kit foxes are most active. To the extent possible, night-time activity should be minimized; for example equipment repair. Off-road traffic outside of designated project areas should be prohibited (USFWS 1999).

8. Excavating, filling, and other earth moving will be done in a cautious manner with a biological monitor present to allow wildlife species to escape in advance of machinery and moving materials.

9. Prior to installation or operations and maintenance activities, a qualified wildlife biologist will conduct avian nest surveys within the vicinity of the project area, specifically for Swainson's hawk, bald eagle (*Haliaeetus leucocephalus*), and white-tailed kites. Focused raptor surveys will be conducted during the appropriate time of the breeding season (March 1 through August 1) if activities are expected to take place during the breeding season. If any of protected species are found nesting in these areas, the project site would either be moved to avoid any potential impacts or the work would be rescheduled to occur during the non-breeding season. No

10. To prevent inadvertent entrapment of San Joaquin kit foxes or other animals during the construction phase of a project, all excavated, steep-walled holes or trenches more than 2 feet deep will be covered at the close of each working day by plywood or similar materials, or provided with one or more escape ramps constructed of earth fill or wooden planks with a slope of 2:1. Before such holes or trenches are filled, they will be thoroughly inspected for trapped animals. If at any time a trapped or injured kit fox is discovered, the procedures of the standardized recommendations must be followed (USFWS 1999).

11. All construction pipes, culverts, or similar structures with a diameter of four inches or greater that are stored at a construction site for one or more overnight periods should be thoroughly inspected for kit foxes before the pipe is subsequently buried, capped, or otherwise used or moved in any way. If a San Joaquin kit fox is discovered inside a pipe, that section of pipe should not be moved until the USFWS has been consulted. If necessary, and under the direct supervision of the biologist, the pipe may be moved once to remove it from the path of construction activity, until the fox has escaped (USFWS 1999).

12. All food-related trash items such as wrappers, cans, bottles, and food scraps will be disposed of in closed containers and removed at least once a week from a construction or project site (USFWS 1999).

13. No firearms shall be allowed on the project site (USFWS 1999).

14. To prevent harassment, mortality of kit foxes or destruction of dens by dogs or cats, no pets will be permitted on project sites (USFWS 1999).

15. Use of rodenticides and herbicides in project areas will be restricted. This is necessary to prevent primary or secondary poisoning of San Joaquin kit foxes and the depletion of prey populations on which they depend. All uses of such compounds should observe label and other restrictions mandated by the United States. Environmental Protection Agency, California Department of Food and Agriculture, and other State and Federal legislation, as well as additional project-related restrictions deemed necessary by the USFWS. If rodent control must be conducted, zinc phosphide should be used because of proven lower risk to kit fox (USFWS 1999).

16. Construction will be limited to daytime hours.

17. If any listed species is observed on or near the project area, the project will be moved to avoid all impacts to species; scheduled operations and maintenance activities will be rescheduled or postponed to avoid impacts to listed species.

18. Vegetative planting techniques shall not cause major disturbances to soils and slopes.

2.2.1 Monitoring Equipment

The following equipment would be installed at each site:

- WaterLog H350XL/H355 gas bubbler/data logger combo
- GOES satellite transmitter (H-222DASE)
- Multi-parameter water quality sensor - YSI 6600 V2-4 Sonde
- Air dessicator
- 12-volt battery
- Solar panels
- Staff gage

In a WaterLog H350XL/H355 gas bubbler/data logger system, an orifice is attached securely below the water surface and connected to the instrumentation by a length of tubing. Pressurized gas (usually nitrogen or air) is forced through the tubing and out the orifice. Because the pressure in the tubing is a function of the depth of water over the orifice, a change in the stage of the river produces a corresponding change in pressure in the tubing. Changes in the pressure in the tubing are recorded and are converted to a record of the river stage. Installation of this instrumentation would help prevent data loss during the water year and flood events, and since there are low installation and maintenance requirements for this type of equipment, overall potential environmental impacts would be minimized. The gas bubbler set-up has a self-maintaining purging option to prevent sediment accumulation and system failure.

The water quality sonde would measure electroconductivity, pH, temperature, chlorophyll, turbidity, and dissolved oxygen. All stations would be equipped with a GOES H-222DASE satellite transmitter to record and transmit the stage and water quality data via Geostationary Orbit Environmental Satellite (GOES). In addition to the electronic data collection and transmitting equipment, an air desiccator, a non-spillable 12 volt battery, and a solar panel/controller would also be installed in the gage house at each site. Also, a new graduated staff gage would be placed in the river to visually note the stage of the river during field visits.

Each site would require less than 25 cubic yards of material to complete the retrofit and installation of the monitoring stations.

2.2.2 Chowchilla Bifurcation Structure Site

2.2.2.1 Location

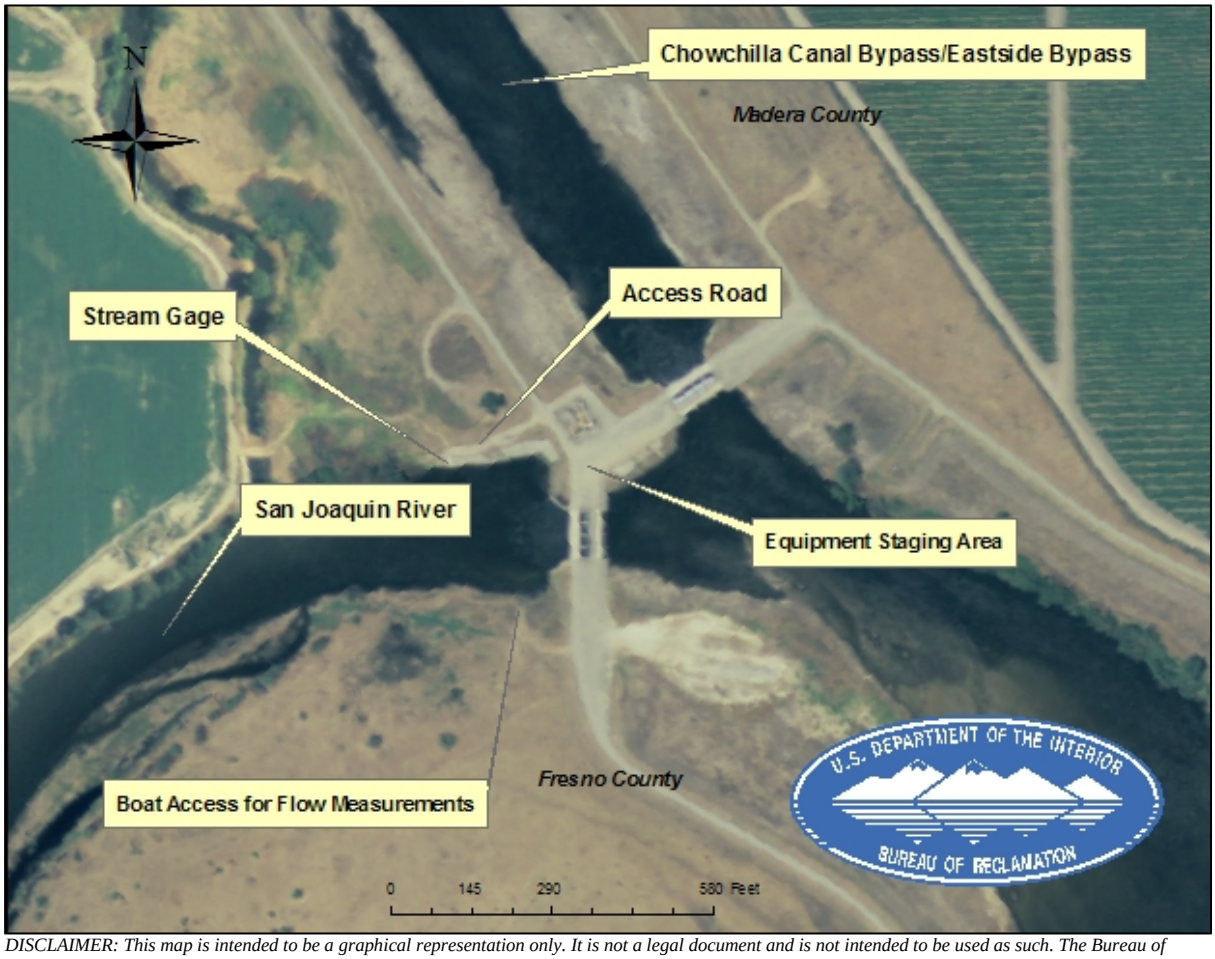
The bifurcation structure is located at the head of the Chowchilla Bypass on the San Joaquin River approximately 50 miles downstream from Friant Dam at River Mile (RM) 216.1 (Figure 2). The project site lies on the right, descending bank of the river in Madera County at Latitude 36.7667 N and Longitude 120.2831 W (T13S R15E Section 25 of Mendota Dam Quadrangle). This portion of the San Joaquin River is typically dry under current operating conditions, unless flood releases are being made from Friant Dam. There is an existing stream gage located approximately 200 feet downstream of the bifurcation structure on the right bank of the San Joaquin River. This gage station was installed by the Friant Water Users Authority and is currently operated by the San Luis and Delta Mendota Water Authority under an agreement with Reclamation.

2.2.2.2 Scope of Work

The stream gage currently consists of a three foot diameter corrugated metal stilling well structure (gage house) with a four inch galvanized intake pipe (communication line) anchored to the stream channel using t-posts (Figures 3 and 4). The communication line allows river water to enter the stilling well so that the river stage can be measured and recorded. The river stage is currently measured by a Stevens recorder unit and mechanical float system installed in the stilling well (gage house). Survey data indicate that the gage is adequate for measuring the higher range of restoration flows anticipated at the site, but inadequate for measuring lower flows due to scouring of the channel during recent flood events (Figure 4).

In order to measure the lower range of anticipated restoration flows in the San Joaquin River Channel downstream of the bifurcation structure, the SJRRP would equip the gage station with a WaterLog H350XL/H355 gas bubbler/data logger system.

The existing 4 inch intake pipe would be extended approximately 45 feet further into the river channel to measure the lower range of flows, and the bubbler line would be run through the intake pipe into the existing stilling well. 45 feet of 4 inch galvanized pipe would be added to the existing intake pipe by hand. The intake pipe extension would be anchored to the streambed using t-posts driven directly into the streambed. The probe from the water quality sonde would be installed at the end of the intake pipe and connected to the data logger inside the gage house via a cable which would run inside the intake pipe. The staff gage would be installed on the stream bank adjacent to the gage house.



DISCLAIMER: This map is intended to be a graphical representation only. It is not a legal document and is not intended to be used as such. The Bureau of Reclamation gives no guarantee, expressed or implied, as to the accuracy or reliability of the data.

Figure 2: Aerial view of site showing stream gage, access road, equipment staging area and existing boat access for flow measurements.

Access to the site would be from the existing gravel and dirt roads on the project levee system (Figure 2). Equipment would be staged in the gravel parking area at the site (Figure 5). No excavation would be required for the installation of this system. The equipment required would include a pickup truck, and various hand held tools such as a t-post driver. The installation would take a crew of two approximately 3 days to complete. Boat access would be required to take discharge measurements at high flows during operation of the gage. Boat access would be gained via the existing dirt road on the left bank downstream of the structure (Figure 2). Boat access would be required approximately once per month during high flow periods.

Figure 3: Existing stream gage showing communication line in foreground and stilling well structure on top right stream bank in background.

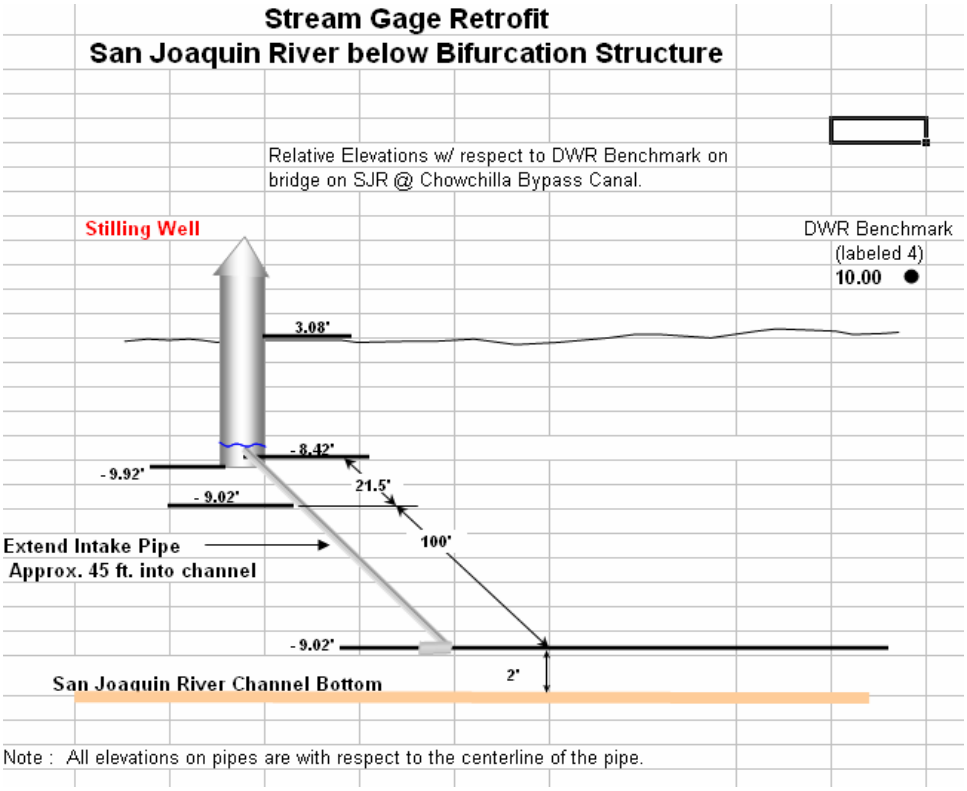


Figure 4: Schematic for Stream Gage Retrofit on the San Joaquin River downstream of the Chowchilla Bypass – Bifurcation Structure.


Figure 5: Equipment Staging Area.

2.2.2.3 Operation and Maintenance

Operations staff from the South Central California Area Office (SCCAO) of the Bureau of Reclamation would operate and maintain the stream gage at the Chowchilla Bypass Bifurcation Structure. Routine operation and maintenance activities associated with the stream gage would include replacing paper charts, pens and the 12 volt storage battery as needed. The intake pipes that allow river water to enter and leave the stilling well would be flushed annually by pumping river water in the stilling well to a level several feet above river stage and allowing it to flow out of the intake.

Boat access would be required to take discharge measurements at high flows during operation of the gage. Boat access would be gained via the existing dirt road on the left bank downstream of the structure (Figure 2). Boat access would be required approximately once per month during high flow periods.

2.2.3 Below Sack Dam Site

Figure 6: Aerial view of site with relevant project features.

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2.2.3.1 Location

The stream gage station is located on the left bank of the San Joaquin River approximately 0.7 miles downstream from Sack Dam at RM 181.1, approximately 7 miles east of the town of Dos Palos (Figure 6). The gage house is located at 36°59'38.35"N Latitude and 120°30'5.29"W Longitude (T11S R13E Section 12 of the Oxalis Quadrangle). The station is currently not operational and has only been used intermittently since 1954, when the U.S. Geological Survey (USGS) ceased using it as a monitoring station. Reclamation used the station for monitoring stream flow in the early 70s. Currently, the station is abandoned and the corrugated metal housing has no equipment inside (Figure 8).


Figure 7: Two-inch diameter metal pipe protruding from the bottom of the corrugated metal housing.

2.2.3.2 Scope of Work

As shown in Figure 7, there is a two inch diameter metal pipe protruding from the bottom of the corrugated metal housing. For the installation of the WaterLog H350XL/H355 gas bubbler/data logger system, the smaller section with the perforations would be removed, and a new section of pipe would be attached to the stub (via 90 degree elbow). The 2-inch PVC conduit containing the bubbler tubing would run above the ground from the walkway down the side of the embankment and into the water. From the gage house, approximately 30 feet of pipe would be required, of which 25 feet of pipe would be in the channel. At the end of the pipe, an anchor would be used to keep the end of the pipe, containing the bubbler tubing, stable while the stream flow measurements are recorded.

The installation of the water quality sonde would consist of attaching a box to the railing at the front of the walkway (Figure 8) that would house the YSI 600R Sonde water quality sensor as illustrated in Figure 9. The sensor cable would be contained in a four inch schedule 80 polyvinylchloride (PVC) conduit that would be mounted to the top of the railing and the side of the can and then would run down into the river. One staff gage would be mounted on the can itself and one would be placed in the river to visually note the stage of the river during field visits.

Three anchors would be required to anchor the conduit in place. The anchors would be 18 inches in diameter and 15 inches deep, with a concrete donut cylinder in a 2” diameter

galvanized hole. The anchors would be fabricated offsite and cured a minimum of 30 days prior to the placement in the river and would rest on the surface of the stream bed. A steel T post would be driven through the anchor hole and the conduit secured to the T post.

Figure 8: San Joaquin River below Sack Dam station house and walkway.

The retrofit/renovations of the Sack Dam station would be performed utilizing a variety of hand tools including hammers, saws, shovels, and picks. No trenching would be required for the installation of either the 2 inch or 4 inch diameter PVC conduit and the concrete anchors in the river. No removal of sediment from the river channel would be required. Minimal digging may be needed near the walkway on the top of the embankment. There would be no vegetation disturbance either in the river channel or ground area surrounding the gage house

when the renovation is performed. It is anticipated that no vegetation removal would be required in the future.

Station renovations and installation of the equipment would require approximately 3-5 days at the site. Staff to perform the necessary work would consist of 2-3 Water Resources Technicians. Work in the river would require 2-3 days, 3 hours per day between the hours of 10:00 AM to 2:00 PM for installation of the 2" diameter PVC pipe conduit and 2-3 18 inch diameter concrete anchors in the San Joaquin River. The concrete anchors would be fabricated offsite, a minimum of 30 days prior to the installation in the river. Two eight hour days would be required to renovate the abandoned gaging station. Entrance to the Sack Dam station is accessed by a dirt road between the San Joaquin River and a canal. A locked gate is at the entrance of the dirt road and entry is gained by contacting local water agency.

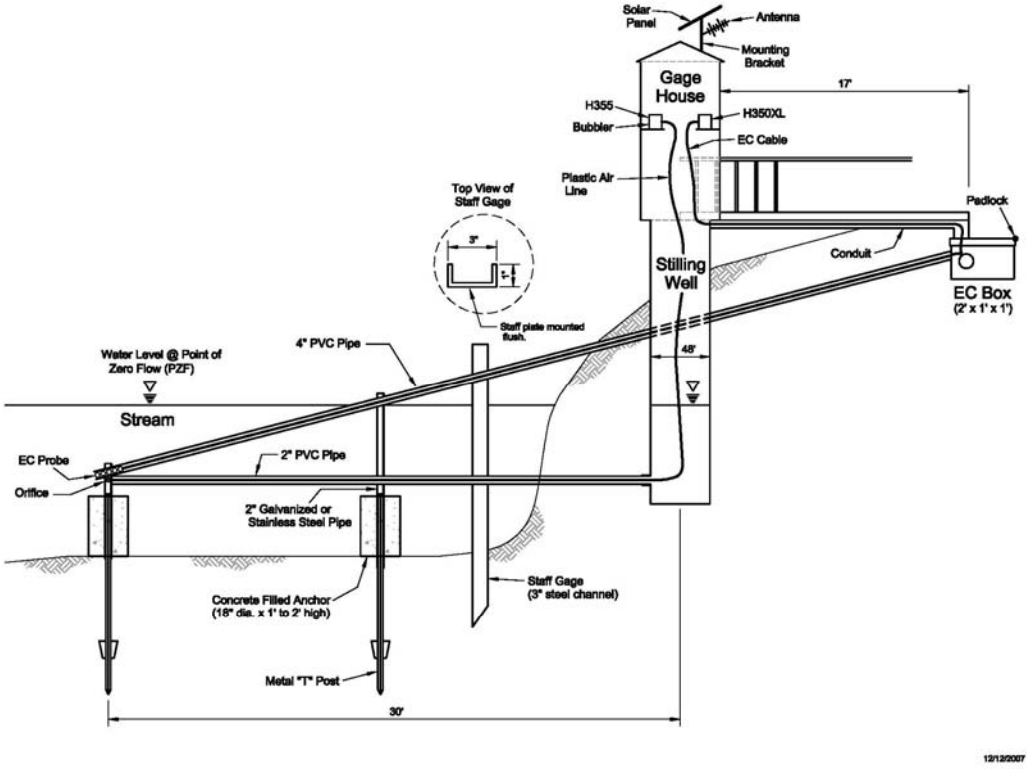

Figure 9: Installation schematic for WaterLog H350XL/H355 gas bubbler/data logger, GOES satellite transmitter (H-222DASE) and YSI 600R Sonde water quality sensor at the Below Sack Dam Station Site.

2.2.3.3 Operation and Maintenance

DWR is anticipating operating this station for the life of the restoration project. It is not expected that major operation and maintenance would be required at the site unless vandalism or destruction to the station takes place. Operations staff from DWR's San Joaquin District would operate and maintain the stream gage below Sack Dam. Routine operation and

maintenance activities associated with the stream gages would include replacing the 12 volt storage battery as needed and servicing the electronic equipment.

2.2.4 Reach 4B Site

During most years the San Joaquin River flows through Reach 4B only intermittently and only during high water events, because at Reach 4B, the San Joaquin River is diverted to the Eastside Bypass (Figure 10), very little flow data has been collected, especially under low-flow conditions. A decision has not been made on whether the Eastside Bypass or the original river channel will be used for the river restoration project. Therefore, both channels would need flow monitoring stations. Currently, there are no flow monitoring stations near the top of Reach 4B.

2.2.4.1 Location

The locations of the proposed new monitoring stations are shown in Figure 11. One would be located in the San Joaquin River at Reach 4B and the other located in the Connector Channel that connects the river to the Eastside Bypass (T9S R13E Section 31 of Santa Rita Bridge Quadrangle).

DISCLAIMER: This map is intended to be a graphical representation only. It is not a legal document and is not intended to be used as such. The Bureau of Reclamation gives no guarantee, expressed or implied, as to the accuracy or reliability of the data.

Figure 10: Top of Reach 4B Area Hydraulic Features.

DISCLAIMER: This map is intended to be a graphical representation only. It is not a legal document and is not intended to be used as such. The Bureau of Reclamation gives no guarantee, expressed or implied, as to the accuracy or reliability of the data.

Figure 11: Reach 4B and Connector Channel Flow Monitoring Station Sites.

2.2.4.2 Scope of Work

Both locations would require new complete installations of all equipment. A schematic for each gage installation is shown on Figure 12 and Figure 15.

Reach 4B Station Site – This site is located downstream from the control structure on the Reach 4B channel (Figure 13). The monitoring station for the Reach 4B channel would be located on the right bank of the San Joaquin River approximately 800 feet downstream of the headgates (RM 168.3, Lat. 37 deg. 6 min. 47.96 sec N, Long. 120 deg. 35 min, 32.44 sec W). Access to the site would be gained from Washington Road to the north of the gage house.

Installation of the new gage house would first require the placement of a 5' by 5' by 1' concrete slab. Then the new gage house would be installed on top of the slab. A section of two-inch pipe would be attached to the gage house (via a 45-90 degree elbow) for the WaterLog H350XL/H355 gas bubbler/data logger bubble tubing. The conduit would run above the ground from the gage house down the side of the embankment and into the water. From the gage house, approximately 20-45 feet of pipe would be required of which 10-20 feet of pipe would be in the river channel. At the end of the section of pipe in the river, an anchor would be used to keep the end of the pipe, containing the bubbler tubing, stable.

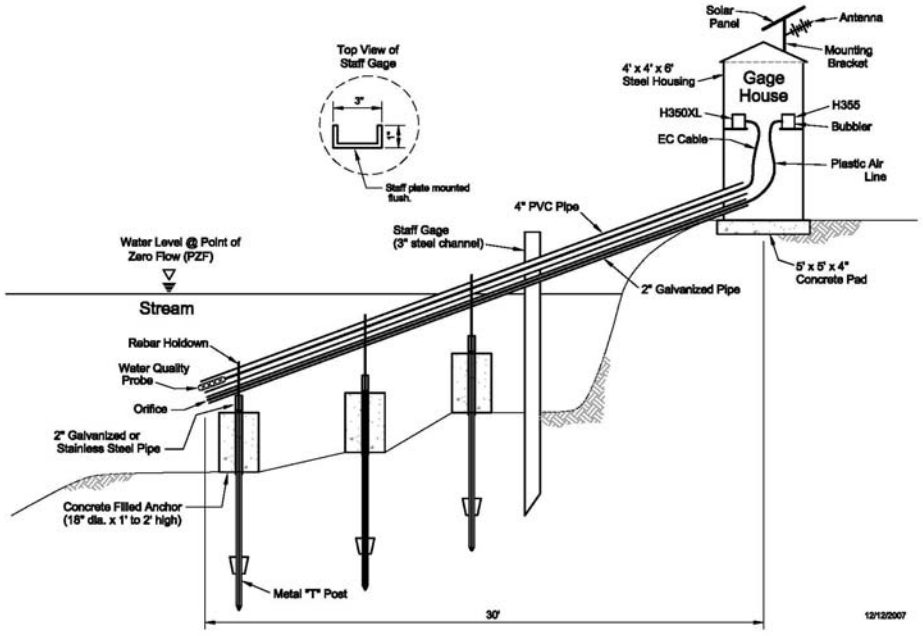

Figure 12: Installation schematic for WaterLog H350XL/H355 gas bubbler/data logger, GOES satellite transmitter (H-222DASE) and YSI 600R Sonde water quality sensor at the Reach 4B Station Site

The installation of the water quality sonde would consist of attaching the box inside the gage house that would house the YSI 600R Sonde water quality sensor as illustrated in Figure 12. The sensor cable would be contained in a four inch diameter PVC conduit that would be mounted inside of the gage house and then would run down into the river. Additional 1-2 anchors may be required between the end of the conduit and the gage house to further secure the conduit to the ground surface. The anchors are 18 inches in diameter, 15 inches deep, concrete cylinder with a rebar eye to secure the PVC conduit (Figure 12).One staff gage would be placed in the river to visually note the stage of the river during field visits.

The installation of this station would be performed utilizing a variety of hand tools including hammers, saws, shovels, portable cement mixer and picks. A crane would be required to move and position the gage house on a concrete slab. No trenching would be required for the installation of the 2 inch or 4 inch diameter PVC conduit and the concrete anchors in the river. No removal of sediment from the river channel would be required. Excavation of a rectangular area of 5 feet by 5 feet by 2 feet would be required for the gage house concrete slab (Figure 12). Minimal digging may be required on the top of the embankment. There would be vegetation disturbance and removal in the river channel consisting of water hyacinths. Minimal ground surface vegetation removal may be required for the area

surrounding the gage house when the installation is performed. It is anticipated that no ground vegetation removal would be required in the future once the station is installed.

Figure 13: Looking downstream on the Reach 4B channel below the control structure.

Preparation of the site and installation of the gage house and monitoring equipment would require approximately 8-10 days at the site. Staff to perform the necessary work would consist of 2-4 Water Resources Technicians. Work in the river would require 2-3 days, 3 hours per day between the hours of 10:00 AM to 2:00 PM for installation of the 2" and 4" diameter PVC pipe conduit and 2-3 18 inch diameter concrete anchors in the river. Four to five eight hour days would be required to prepare a concrete pad and install a new gag house. Station setup would require an additional two days. Entrance to the site is accessed by a levee right of way dirt road and the site may be on levee right of way or private property.

Connector Channel Site - This station is located downstream to the Parshall Flume on the connector channel leading to the Eastside Bypass and upstream from a county bridge (Figure 14). The stream gage house to measure flows in the connector channel would be located on the left bank of the channel approximately 200 feet downstream of the Parshall flume (RM 168.4, Lat. 37 deg. 6 min. 46.70 sec N, Long. 120 deg. 35 min. 18.51 sec W).

Figure 14: Looking at the Connector Channel downstream from the Parshall Flume to the Washington Street Bridge.

Installation of the new gage house would first require the placement of a 5' by 5' by 1' concrete slab. Then the new gage house would be installed on top of the slab. A section of two-inch pipe would be attached to the gage house (via a 45-90 degree elbow) for the WaterLog H350XL/H355 gas bubbler/data logger bubble tubing. The conduit would run above the ground from the gage house down the side of the embankment and into the water. From the gage house, approximately 30-60 feet of pipe would be required of which 10-20 feet of pipe would be in the river channel. At the end of the section of pipe in the river, an anchor would be used to keep the end of the pipe, containing the bubbler tubing, stable.

The installation of the water quality sonde would consist of attaching the box inside the gage house that would house the YSI 600R Sonde water quality sensor as illustrated in Figure 12. The sensor cable would be contained in a four inch diameter PVC conduit that would be mounted inside of the gage house and then would run down into the river. Additional 1-2 anchors may be required between the end of the conduit and the gage house to further secure the conduit to the ground surface. The anchors are 18 inches in diameter, 15 inches deep, concrete cylinder with a rebar eye to secure the PVC conduit (Figure 15). One staff gage would be placed in the river to visually note the stage of the river during field visits.

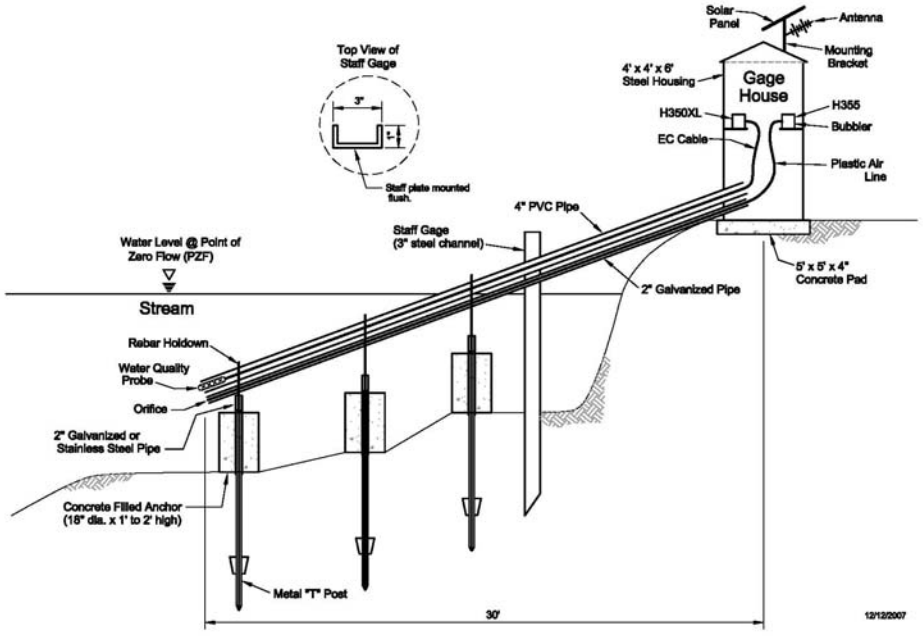

Figure 15: Installation schematic for WaterLog H350XL/H355 gas bubbler/data logger, GOES satellite transmitter (H-222DASE) and YSI 600R Sonde water quality sensor at the Connector Channel Station Site

The installation of this station would be performed utilizing a variety of hand tools including hammers, saws, shovels, portable cement mixer and picks. A crane would be required to move and position the gage house on a concrete slab. No trenching would be required for the installation of the 2 inch diameter PVC conduit and the concrete anchors in the channel. No removal of sediment from the channel would be required. Excavation of a rectangular area of 5 feet by 5 feet by 2 feet would be required for the gage house concrete slab (Figure 15). Minimal digging may be required on the top of the embankment. There would be no vegetation disturbance and removal in the channel. No ground surface vegetation removal would be required for the area surrounding the gage house when the installation is performed. It is anticipated that no ground vegetation removal would be required in the future once the station is installed; there would be no need for any vegetation removal in the channel. This section of the connector channel is typically dry and construction would be performed in the dry if at all possible.

Preparation of the site and installation of the gage house and monitoring equipment would require approximately 9-11 days at the site. Staff to perform the necessary work would consist of 2-4 Water Resources Technicians. Work in the channel would require 3-4 days, 3

hours per day between the hours of 10:00 AM to 2:00 PM for installation of the 2" diameter PVC pipe conduit and 2-3 18 inch diameter concrete anchors in the channel. The concrete anchors would be fabricated offsite, a minimum of 30 days prior to the installation in the channel. Four to five eight hour days would be required to prepare a concrete pad and install a new gaging station. Station setup would require an additional two days. Access to this location would be via the existing gravel parking area and road (lower left in Figure 16). The site is located in an area designated as "project levee".

Figure 16: Looking at Washington Road Bridge downstream of Parshall Flume.

2.2.4.3 Operation and Maintenance

DWR is anticipating operating this station for the life of the restoration project. It is not expected that major operation and maintenance would be required at the site unless vandalism or destruction to the station takes place. Operations staff DWR's San Joaquin District would operate and maintain the stream gage below Sack Dam. Minimal operation and maintenance are typically required for these types of stream gages. Routine operation and maintenance activities associated with the stream gages would include replacing the 12 volt storage battery as needed and servicing the electronic equipment.

2.2.5 Merced River Confluence

The proposed location for this new stream gage is approximately one quarter mile above the confluence of the San Joaquin and Merced Rivers near the town of Newman in Merced County, California (Figures 17, 18 and 19).

2.2.5.1 Location

Two sites are currently under consideration for the stream gage. The first site is on the left (descending) bank of the river (37°20'50.58"N, 120°58'33.35"W) and the second is directly across the river on the right bank (37°20’49.894”N, 120°58’27.286”W). The exact gage location would be selected based on availability of site access and other logistical considerations. The gage would be sited within the circle shown on Figure 17. A photo showing the sites is shown in Figure 18.

Figure 17: Aerial view of site with relevant project features.

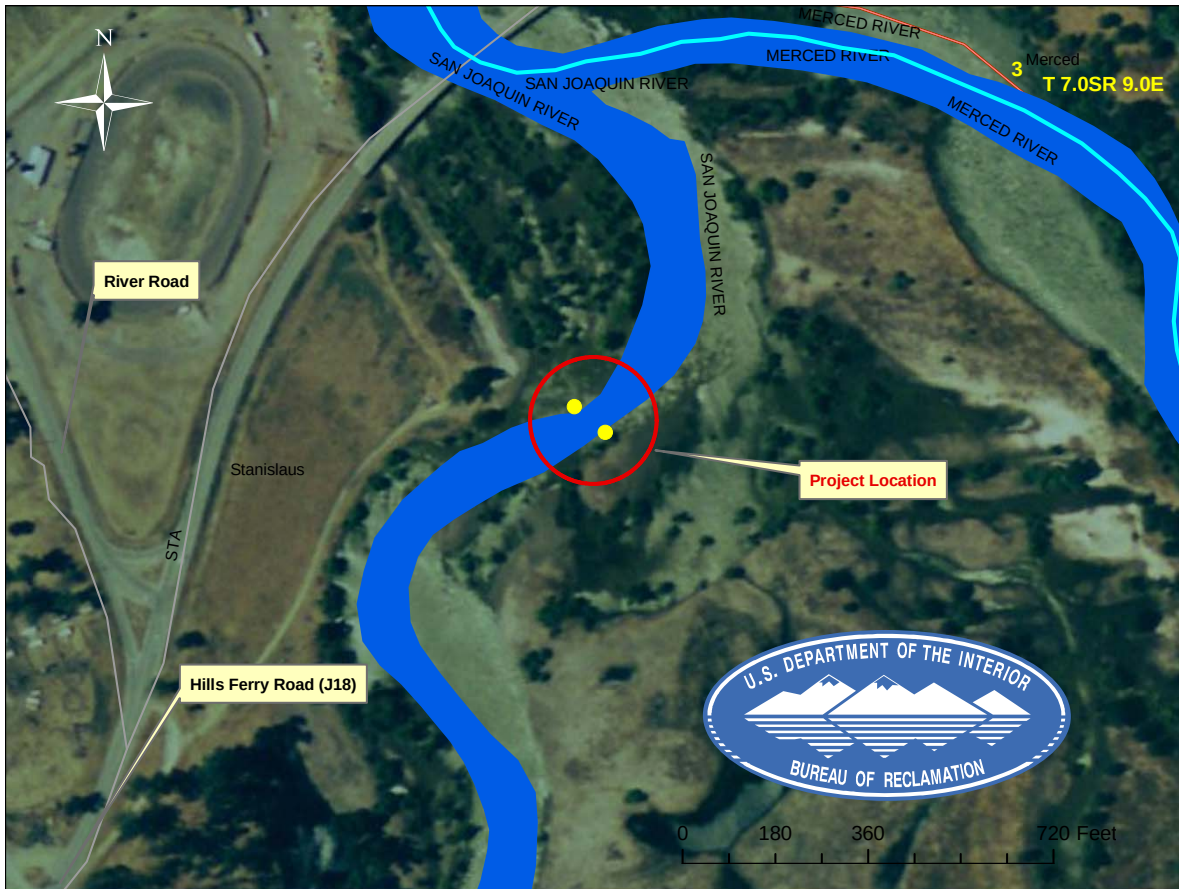

Figure 18: Proposed site locations. Left bank site is located in right foreground in photo; right bank site is located in the center of photo on the far bank (Photo is taken looking upstream).

2.2.5.2 Scope of Work

The stream gage would require installation of a station house, a datalogger with GOES satellite transmission capabilities, and an antenna. A schematic for the gage installation is shown on Figure 19. The stations would be equipped with a Water Log H350XL/H355 gas bubbler/data logger combo, and a GOES H-222DASE satellite transmitter. The water quality measuring equipment would consist of an YSI 6600 V2-4 Sonde water quality sensor for measuring the water quality parameters.

In addition to the electronic data collection and transmitting equipment, the following would also be installed: an air dessicator, a non-spillable 12 volt battery, and a solar panel/controller. Also, a new graduated staff gage would be placed at each site to visually note the stage of the river during field visits. Furthermore, 18 inches in diameter, 12-15 inches deep concrete anchors, cured for a minimum of 30 days, would be used to keep pipes, containing the bubbler tubing and Sonde electrical lines, stable, while the stream flow measurements and water quality parameters are recorded.

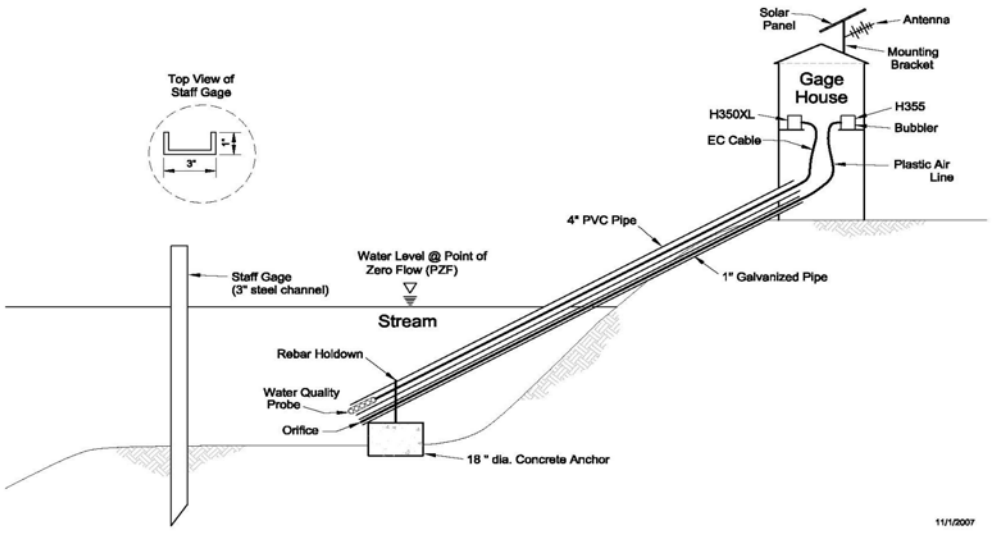

Figure 19: Installation schematic for WaterLog H350XL/H355 gas bubbler/data logger, GOES satellite transmitter (H-222DASE) and YSI 600R Sonde water quality sensor at the Merced River Confluence site.

Preparation of the site and installation of the gaging house and monitoring equipment would require approximately 8-10 days at the site. Staff to perform the necessary work would consist of 2-4 Water Resources Technicians. Work in the river would require 2-3 days, 3 hours per day between the hours of 10:00 AM to 2:00 PM for installation of the 2" and 4" diameter PVC pipe conduit and 2-3 18 inch diameter concrete anchors in the San Joaquin River. The concrete anchors would be fabricated and cured offsite, a minimum of 30 days prior to the installation in the river. Four to five eight hour days would be required to prepare a concrete pad and install a new gaging station. Station setup would require an additional two days. Entrance to the site is accessed by dirt road on private property or by boat depending on which site is selected.

The installation of this station would be performed utilizing a variety of hand tools including hammers, saws, shovels, portable cement mixer and picks. A crane would be required to move and position the gage house on a concrete slab. No trenching would be required for the installation of the 2 inch diameter PVC conduit and the concrete anchors in the river. No removal of sediment from the river channel would be required. Excavation of a rectangular area of 5 feet by 5 feet by 2 feet would be required for the gage house concrete slab. Minimal digging may be required on the top of the embankment. Minimal ground surface vegetation

removal may be required for the area surrounding the gage house when the installation is performed. It is anticipated that no ground vegetation removal would be required in the future once the station is installed.

A section of two inch pipe would be attached to the gage house (via a 45-90 degree elbow). The conduit would run above the ground from the gage house down the side of the embankment and into the water. From the gage house, approximately 20-45 feet of pipe would be required of which 10-20 feet of pipe would be in the channel. At the end of the section of pipe in the river, an anchor would be used to keep the end of the pipe, containing the bubbler tubing, stable while the streamflow measurements are recorded. Additional 1-2 anchors may be required between the end of the conduit and the gage house to further secure the conduit to the ground surface. The anchors are 18 inches in diameter, 15 inches deep, concrete cylinder with a rebar eye to secure the PVC conduit. The anchors would be fabricated offsite and cured a minimum of 30 days prior to the placement in the river and would rest on the surface of the stream bed. The gas bubbler set-up has a self-maintaining purging option to prevent sediment accumulation and system failure. In addition to the electronic data collection and transmitting equipment, the following would also be installed: an air dessicator, a non-spillable 12 volt battery, and a solar panel/controller. Also, a new graduated staff gage would be placed in the river to visually note the stage of the river during field visits.

2.2.5.3 Operation and Maintenance

Boat access would be required to take discharge measurements at high flows during operation of the gage. Boat access would be gained via the existing boat ramp on the San Joaquin River downstream of the site. Boat access would be required approximately once per month during high flow periods. Low flow discharge measurements would be made by wading the stream with a Price AA velocity meter or equivalent. Bubler systems such as that proposed for this site are relatively low maintanence. Routine operation and maintenance activities associated with the stream gage would include periodic servicing of the electronic equipment and replacing parts such as the 12 volt storage battery as needed.

Section 3 Affected Environment and Environmental Consequences

3.1 Water Resources

3.1.1 Affected Environment

The San Joaquin River Restoration Study area includes approximately 150 miles of the San Joaquin River from Friant Dam at the upstream end near the town of Friant, to the confluence with the Merced River at the downstream end. The river has been subdivided into five primary reaches that exhibit similar flows, geomorphology, and channel morphology (Figure 1). Table 2 below shows the RM boundaries of the five reaches and selected landmarks within each reach.

Table 2: River Mile Boundaries of the Five Reaches and Selected Landmarks.

	Land Mark	River Mile
Reach 1		*267.5 to 229.0*
	Friant Dam	267.5
	Gravelly Ford	229.0
Reach 2		*229.0 to 204.8*
	Chowchilla Bypass Bifurcation Structure	216.1
	Mendota Dam	204.8
Reach 3		*204.8 to 182.0*
	Sack Dam	182.0
Reach 4		*182.0 to 135.8*
	Sack Dam	182.0
	Sand Slough Control Structure	168.5
	Mariposa Bypass Confluence	147.2
	Eastside Bypass Confluence	135.8
Reach 5		*135.8 to 118.0*
	Merced River Confluence	118.0

Source: McBain & Trush, Inc. (eds.), 2002.

The flow monitoring station sites analyzed in this assessment are located in Reaches 2, 4 and 5. The Chowchilla Bifurcation Structure Site is located at the beginning of Reach 2B. The Below Sack Dam Site is located at the beginning of Reach 4A, two would be located at the top of Reach 4B, and the one located at Merced and San Joaquin Rivers confluence site would be located in Reach 5.

3.1.1.1 Reach 2

Reach 2 is entirely sand bedded, and meanders across the Pleistocene alluvial fan of the San Joaquin River between Gravelly Ford and Mendota Dam. The confining terraces end at Gravelly Ford, and mark the beginning of the San Joaquin River alluvial fan. The downstream boundary at Mendota Dam also marks the location where the river intersects the

north-south axis of the valley, and where slope decreases. Reach 2 is divided into two subreaches. Reach 2A begins at Gravelly Ford and extends downstream to the Chowchilla Bypass Bifurcation Structure. Reach 2B extends from the bifurcation structure downstream to Mendota Dam. Both subreaches have confining levees protecting agriculture land uses in the reach (McBain & Trush, 2002).

3.1.1.2 Reach 4

Reach 4 is sand bedded and meandering, and is usually dewatered due to the diversion at Sack Dam. Reach 4 is divided into two subreaches. Reach 4A extends from Sack Dam downstream to the Sand Slough Control Structure. The flows in this section of the reach are usually negligible due to the Sack Dam diversion, but periodically flood control flows are conveyed such that a channel is defined through the reach. Reach 4B begins at the Sand Slough Control Structure and extends downstream to the confluence with Bear Creek and the Eastside Bypass. The Reach 4B channel currently is choked with vegetation and contains water, which likely came from groundwater seepage and/or farm drainage water. The upstream portion of Reach 4B no longer conveys river flows because the Sand Slough Control Structure diverts all flows into the bypass system. As a result, the channel in the upstream portion of Reach 4B is poorly defined, filled with dense vegetation, and in some cases, Reach 4B is plugged with fill material. Agriculture is the primary land use in the entire reach. In Reach 4A, the left bank (west side) of the river is bounded by the Poso and Riverside canals, and the right bank (east side) is confined by local dikes. In Reach 4B, the river is no longer bounded by canals, but is confined by small local dikes downstream to the confluence with the Mariposa Bypass at the San Luis National Wildlife Refuge. Project levees begin at the Mariposa Bypass and continue downstream on both banks (McBain & Trush, 2002)

3.1.1.3 Reach 5

Reach 5 is sand bedded and meandering, and flows continuously due to agricultural return flows. No sub-reaches were delineated within Reach 5. Reach 5 is bounded on the left bank by Project levees downstream to the Salt Slough confluence and on the right bank to the Merced River confluence (McBain & Trush, 2002).

3.1.1.4 Releases from Friant Dam to San Joaquin River and Diversions to Canals

Downstream releases to meet existing requirements above Mendota Pool (near Gravelly Ford) are approximately 116,700 acre-feet in a year. Reclamation uses 5 cubic feet per second (cfs) as a minimum flow to fulfill the requirement that there be at least 5 cfs flowing past every legal diversion point. The last legal diversion is just upstream of the Gravelly Ford gaging station. When there are no flood releases and there is no localized rain runoff, the flow at Gravelly Ford is typically in the 0 to 20 cfs range. This flow does not extend far downstream from Gravelly Ford because of the porous bed substrate and high rate of percolation. Occasional higher flows at Gravelly Ford under these conditions result from upstream return flows or unused water right releases.

Diversions of water to the Friant-Kern Canal and Madera Canal for delivery to Friant Division contractors are estimated to be an annual average of 1,281,000 acre-feet, and can vary from 322,000 acre-feet in a year to 2,236,000 acre-feet in a year.

3.1.1.5 Water Quality

The San Joaquin River basin is drained by its principal tributaries that flow from the Sierra Nevada range on the basin's east side, the Coast Range on the west side, and the Tulare Lake basin on the south side. Groundwater resources of the San Joaquin River Basin include all or part of the 10 major groundwater basins. Poorer quality (higher salinity) water is imported from the south Delta via the CVP and State Water Project (SWP); this water is used for irrigation along the west side of the San Joaquin River. Irrigation water drains via Salt and Mud Sloughs, and Bear Creek. Reaches 2 and 4 are dry most years; Reaches 1 and 3 have perennial flows from Friant Dam and Mendota Dams, respectively. During the irrigation season (May through October), river flows between the Mendota Pool and Salt Slough largely originate from groundwater and tile drainage of westside agricultural developments. Concentrations of Total Dissolved Solids (TDS), sodium, sulfate, boron, chloride, carbonate/ bicarbonate, and trace elements (e.g., selenium) all increase as CVP-delivered water is applied to westside soils, and as deep percolation returns to the San Joaquin River (Phillips et al. 1991).

3.1.2 Environmental Consequences

3.1.2.1 No Action

No impacts to water resources, including water quality and flow, would occur under this alternative. Water resources would remain as described above.

3.1.2.2 Proposed Action

Implementing the Proposed Action would increase the probability of SJRRP success of restoring and maintaining the fish populations in the main stem of the SJR. Accurate measurements of water flow would aid in avoiding adverse water supply impacts to Friant Division long-term contractors when the settlement agreement is implemented. Accurate stream flow data would be gathered, enabling the SJRRP to compute a water balance for restoration flows, verify assumptions made regarding the hydrographs in "Exhibit B" of the settlement agreement, and plan and evaluate a wide variety of restoration projects. The Proposed Action would not affect the flow or water quality in the river. Reclamation's releases to the river would not be changed by implementation of the Proposed Action.

3.2 Land Use

3.2.1 Affected Environment

Most of the land along the San Joaquin River is under private ownership, and the primary land use is agricultural. Combining all reaches, the breakdown by land use within a half mile of the river centerline is 49% in open space, 48% in agriculture, and 3% in urban. Of the agricultural land use areas (combined for all reaches), annual crops comprised 86.2%, vineyards comprised 8.7%, orchards comprised 4.4%, and semi-agricultural or incidental to agriculture uses comprised 0.7% of the land use.

Private lands comprise over 97% of all land ownership in Reaches 1 through 3; private land decreases to 80% in Reach 4 and 35% in Reach 5. Public ownership is less than 3% in Reaches 1 through 3, but begins to increase in Reach 4 (20%), and continues to increase in Reach 5 (65%). These public lands are largely US Fish and Wildlife refuges and California State Parks. Because the State Lands Commission has not issued claims to the ordinary low

water in most reaches, the percentage of public lands is actually lower than it should be in all reaches. The lands classified as State, County, and Special District Lands in Reach 2 are entirely those lands on the river comprising the San Joaquin River Levee District (McBain & Trush, 2002).

3.2.2 Environmental Consequences

3.2.2.1 No Action

No changes to land use would occur under this alternative.

3.2.2.2 Proposed Action

Land use would remain the same as described in the Affected Environment.

3.3 Biological Resources

3.3.1 Affected Environment

3.3.1.1 Vegetation at Reach 2

Within the levees, the terraces are vegetated by exotic grasses and weeds, and the riparian forest is represented by growth of narrow-leaf willows at the margins of the channel and on formerly active sandbars. Riparian vegetation in the upper 10 miles of this reach (Reach 2A) is sparse or absent because the river is usually dry and the shallow groundwater is overdrafted. However, there is an expanse of elderberry savanna on the left side near the Chowchilla Bifurcation Structure at the junction of Reaches 2A and 2B. The lower few miles of Reach 2B support narrow, patchy, but nearly continuous vegetation where backwater forms upstream of Mendota Pool. The vegetation in Reach 2B may be supported by a shallower groundwater aquifer supplemented by Mendota Pool. In most years, the channel is essentially dry most of the year from Gravelly Ford to Mendota Pool, except under flood release conditions, when up to 2,000 cfs may be passed downstream of the Chowchilla Canal bypass inlet (McBain & Trush, 2002).

3.3.1.2 Vegetation at Reach 4

Reach 4A is only sparsely vegetated, with a very thin band of vegetation along the channel margin (or none at all). Sporadic narrow strands or patches of mostly willow scrub occur, as do small “potholes” with marsh vegetation (JSA and MEI, 1998). For most of the year, Reach 4A is dry. Survival of established riparian vegetation does not appear to be affected by the intermittent flow because groundwater is shallow along this reach. Full-canopied riparian scrub and forest occur in small to large stands, and ponds rimmed by small areas of marsh vegetation are present within the channel (JSA and MEI, 1998). In-channel vegetation is supported by flows and/or moisture from: 1) leakage or spillage at Sack Dam, 2) from shallow groundwater, 3) from field drain water, 4) from possible seepage from the canals that border the river. Field drain water is pooled in this section of the San Joaquin River with small berms and/or is run downstream to a small pool where it is recirculated by being pumped out for irrigation. These pools help maintain riparian vegetation, albeit, mostly within the channel outside of the wetted area. Reach 4B upstream of the Mariposa Bypass supports a nearly unbroken, dense, but narrow corridor of willow scrub or young mixed riparian vegetation on most of the reach, with occasional large gaps in the canopy (McBain & Trush, 2002).

3.3.1.3 Vegetation at Reach 5

In Reach 5, the San Joaquin River is surrounded by large expanses of upland grassland with numerous inclusions of woody riparian vegetation within the floodplain. The floodplain and basin are generally disassociated from the mainstem of the river due to project levees, and remnant tree groves are concentrated on the margins of mostly dry secondary channels and depressions, or in old oxbows. Along the mainstem San Joaquin River, a relatively uniform pattern of patchy riparian canopy hugs the channel banks as large individual trees or clumps (primarily valley oaks or black willow) with a mostly grassland or brush understory. Large expanses of herbaceous riparian vegetation and marsh are clustered along the river and sloughs. None of these features are now present (JSA and MEI 1998).

The frequency of overland flow beyond the natural channel banks is likely greater in this reach than in those described previously, because Reach 5 is located downstream of the Mariposa Bypass, and collects flows from the Eastside Bypass and Bear Creek. However, inundation of the floodplain is still less frequent than occurred before construction of Friant Dam. Comparison of cross sections shows that the channel has both widened and deepened in the area where a significant portion of the flood flows from the Eastside Bypass are discharged back into the mainstem San Joaquin River (JSA and MEI 1998; McBain & Trush, 2002).

3.3.1.4 Special Status Plants and Wildlife

This section describes the special-status plant and animal species that occur or have the potential to occur in the project area. A total of 14 special-status plant and animal species were identified as having the potential to occur in the project area (Table 3). Seven of these 14 species have been reported to occur in the project area. The remainder of these 14 species is not known to occur in the project area, but they occur, or occurred historically, in the vicinity of the project area, and the project area may contain potential habitat for these species. The potential for occurrence of these species was classified as low, moderate, or high (Table 3). This classification was based primarily on the availability of suitable habitat in the project area, and the proximity of the project area to documented occurrences of the species.

The following list was obtained on December 28, 2007, by accessing the U.S. Fish and Wildlife Database: http://www.fws.gov/pacific/sacramento/es/spp_lists/auto_list.cfm. The list is for the following 7 ½ minute U.S. Geological Survey quadrangles, in which the three flow monitoring station sites are located: Mendota Dam, Oxalis, Poso Farm, and Santa Rita Bridge.

Table 3: Special Status Species

Common Name	***Species Name***	***Fed Status***	***State Status***	**Potential for Occurrence in Project Area**
Invertabrates				
Longhorn fairy Shrimp	*Branchinecta longiantenna*	E	N	No potential; lack of suitable vernal pool habitat.
Vernal pool fairy shrimp	*Branchinecta lynchi*	T	N	No potential; lack of suitable vernal pool habitat.
Valley elderberry longhorn beetle	*Desmocerus californicus dimorphus*	T	N	No potential; population of valley elderberry longhorn beetles was reported in a stand of elderberry shrubs at RM 245 (Reach 1A) of the San Joaquin River; Numerous host plants were also identified in surveys conducted

				along Reach 1 and 2; Among those examined, one shrub was identified with six recent VELB exit holes in live wood and at least three holes from previous years (Kucera, et al., 2006). However, based on field observations by DWR and Reclamation personnel, all elderberry shrubs are at least 100 feet away from the project footprint, including access roads, and so are too far away to be affected.
Vernal pool tadpole shrimp	*Lepidurus packardi*	E	N	No potential; lack of suitable vernal pool habitat.
Fish				
Delta smelt	*Hypomesus transpacificus*	T	ST	No potential; restricted to the Sacramento/San Joaquin Delta.
Central Valley steelhead	*Oncorhynchus mykiss*	T	N	No potential; work on Merced confluence gage will be done during summer months to avoid the possibility of steelhead presence; maintenance of stream gages will be addressed on an as needed basis or in the larger restoration project.
Central Valley spring-run Chinook salmon	*Oncorhynchus tshawytscha*	T	T	The Settlement requires a spring and fall run population to be reintroduced in to the San Joaquin River between Friant Dam and the confluence of the Merced River by December 31, 2012. Currently there are no salmon populations within or near the project sites.
Amphibians				
California red-legged frog	*Rana aurora draytonii*	T	N	No potential; According to CNDDB now extirpated from the San Joaquin Valley.
California tiger salamander	*Ambystoma californiense*	T	N	No potential; lack of suitable vernal pool habitat. No documentation of occurrences in the project quadrangles, but documented in adjacent quads within 2 miles of the river.
Reptiles				
Blunt-nosed leopard lizard	*Gambilia sila*	E	SE	Moderate potential; There are several records of this species occurring near Mendota Pool in Mendota Dam Quadrangle. However, the project area is generally restricted to being in or near riparian habitat.
Giant garter snake	*Thamnophis gigas*	T	ST	Low potential; CNDDB documented in the Mendota Wildlife Area, and south of the study area in Fresno Slough; Mendota Dam, Oxalis and Santa Rita Bridge Quadrangles. Some marginal habitat occurs in the southern part of the project area; Reach 4B is hyrologically isolated from occupied habitat.
Mammals				
San Joaquin kit fox	*Vulpes macrotis mutica*	E	ST	Moderate potential; August 2001, an unconfirmed sighting near Chowchilla Bifurcation Structure, located at the Chowchilla Bypass along the San Joaquin River. Researchers observed the fox at night with a spotlight (Kucera et al. 2001).
Fresno kangaroo rat	*Dipodomys nitratoides exilis*	E	SE	Low potential; CNDDB documented occurence in Mendota Dam Quad. Captured at the Alkali Sink Ecological Reserve and Mendota Wildlife Management Area near the study area in 1992. Unconfirmed capture in the Gravelly Ford area on the San Joaquin River (P. Kelly, pers. comm., as cited in Newman et al. 2001). Recent trapping at well locations in Reach 2 revealed only Heerman's kangaroo rat (D. heermanii) (Wolfe and Assoc. 2000 and 2001, Kucera et al. 2001). The proposed project would occur in or near riparian habitat, where this species is

				generally not expected to occur.
Plants				
Palmate-bracted birds'-beak	*Cordylanthus palmatus*	E	SE	Low potential; known to occur near the study area at the Alkali Sink Ecological Reserve and Mendota Wildlife Management Area approximately 4 miles south of Reach 2A; Poso Farm Quadrangle. The proposed project would occur in or near riparian habitat, while the palmate-bracted bird's-beak is generally found in seasonally flooded areas with alkaline soils.
Candidate Species - Bird				
Western yellow-billed cuckoo	*Coccyzus americanus occidentalis*	C	SE	Low potential; According to CNDDB occurrences has been recorded in the Mendota Dam Quadrangle. However, the species no longer nests in the San Joaquin Valley. At least 20 hectares of continuous or near-continuous well-developed cottonwood-willow habitat are required for nesting or for occupancy by a single male. This type of habitat has been eliminated from this part of the cuckoo's range. It is possible that birds could migrate through en route to or from breeding areas along the Sacramento River.

E – Federally listed as endangered; T – Federally listed as threatened; C – Federal candidate species; SE – State listed as endangered; ST – State listed as threatened; N – No State listing.

No critical habitat or essential fish habitat occurs in the project area.

Table 4 summarizes information on other special-status species that do or may occur in the project area.

Table 4: Sensitive species potentially impacted by the project.

Species Common Name	**Species Scientific Name**	**Federal Status**	**State Status**	**CNPS Status***	**Habitat**	**Potential for Occurrence in the Project Area**
silvery legless lizard	*Anniella pulchra pulchra*	None	Species of Special Concern	-	Sandy or loose loamy soils under sparse vegetation. Soil moisture is essential. This species prefer soils with high moisture content.	This species was sighted near the Chowchilla Bifurcation structure in April 2000 (DFG 2007). The project will be located on the levee road and channel, areas where this species should not occur.
western pond turtle	*Actinemys marmorata*	None	Species of Special Concern	-	A thoroughly aquatic turtle of ponds, marshes, rivers, streams and irrigation ditches with aquatic vegetation. Need basking sites and suitable (sandy banks or grassy open fields) upland habitat for egg-laying.	This species may inhabit the project area at all sites.

Golden Eagle	*Aqulia chrysaetos*	Migratory Bird Treaty Act Bald Eagle and Golden Eagle Protection Act	Fully Protected; Species of Special Concern	-	Rolling foothills, mountain areas, sage-juniper flats, & desert. Cliff-walled canyons provide nesting habitat in most parts of range; also, large trees in open areas.	The project sites have potential foraging habitat for this species.
Western Burrowing Owl	*Athene cunicularia* ***hypugea***	Migratory Bird Treaty Act	Species of Special Concern	-	Open, dry annual or perennial grasslands, deserts and scrublands characterized by low-growing vegetation. Subterranean nester, dependent upon burrowing mammals, most notably, the California ground squirrel (*Spermophilus beecheyi).*	Burrowing owls may be present or nearby the project sites during construction activities.
Red-tailed Hawk	*Buteo jamaicensis*	Migratory Bird Treaty Act	None	-	Inhabits many different types of habitats, usually with trees or forested areas with open areas.	The project sites have potential nesting habitat nearby.
Swainson's Hawk	*Buteo swainsoni*	Migratory Bird Treaty Act	Threatened	-	Breeds in grasslands with scattered trees, juniper-sage flats, riparian areas, savannahs, and agricultural or ranch land. Requires adjacent suitable foraging areas such as grasslands, or alfalfa or grain fields supporting rodent populations.	There are suitable nest trees for this species near the project area. There is a high potential for this species to nest near the project area at all three sites.
Mountain Plover	*Charadrius montanus*	Migratory Bird Treaty Act	Species of Special Concern	-	Short grasslands, freshly plowed fields, newly sprouting grain fields, and sometimes sod farms. Short vegetation, bare ground and flat topography. Prefers grazed areas and areas with burrowing rodents.	This species winters in the Central Valley, and does not use riparian corridors, altough the species may in occur in habitats near the project sites.
Northern Harrier	*Circus cyaneus*	Migratory Bird Treaty Act	Species of Special Concern	-	This species inhibits grasslands, marshes, and agricultural fields. Harriers hunt for small mammals by gliding right over the vegetation. Nests on the ground.	The project sites have potential habitat for this species.

White-tailed Kite	*Elanus leucurus*	Migratory Bird Treaty Act	Fully Protected	-	Rolling foothills and valley margins with scattered oaks & river bottomlands or marshes next to deciduous woodland. Open grasslands, meadows, or marshes for foraging close to isolated, dense-topped trees for nesting and perching.	The project sites have potential habitat for this species.
Bald Eagle	*Haliaeetus leucocephalus*	Migratory Bird Treaty Act Bald Eagle and Golden Eagle Protection Act	Endangered	-	Nests in large, old-growth, or dominant live tree with open branches, especially ponderosa pine. Roosts communally in winter. Uses ocean shore, lake margins, and rivers for both nesting and wintering. Most nests within 1 mile of water.	This species is known to nest along the Chowchilla Bypass. The project sites have potential nesting and roosting habitat for this species.
Bank Swallow	*Riparia riparia*	Migratory Bird Treaty Act	Threatened	-	Colonial nester; nests primarily in riparian and other lowland habitats west of the desert. Requires vertical banks/cliffs with fine-textured/sandy soils near streams, rivers, lakes, ocean to dig nesting hole.	There is habitat near the Sack Dam stream gage site, by Mendota Dam. The project will not dig or trench into the natural bank of the river.
Nelson's antelope squirrel	*Ammospermophilus nelsoni*	None	Threatened	-	Western San Joaquin valley from 200-1200 feet elevation on dry, sparsely vegetated loam soils. Dig burrows or use kangaroo rat burrows. Needs widely scattered shrubs, forbs and grasses in broken terrain with gullies and washes.	The project sites and the nearby areas have very marginal if any habitat for this species.
western mastiff bat	*Eumops perotis californicus*	None	Species of Special Concern	-	Many open, semi-arid to arid habitats, including conifer and deciduous woodlands, coastal scrub, grasslands, chaparral etc. Roosts in crevices in cliff faces, high buildings, trees and tunnels.	The project sites and the nearby areas have very marginal if any habitat for this species.
hoary bat	*Lasiurus cinereus*	None	Species of Special Concern	-	Prefers open habitats or habitat mosaics, with access to trees for cover and open areas or habitat edges for feeding. Roosts in dense foliage of medium to large trees. Feeds primarily on moths. Requires a water source.	The project sites and the nearby areas have very marginal if any habitat for this species.

San Joaquin pocket mouse	*Perognathus inornatus inornatus*	None	None	-	Typically found in grasslands and blue oak savannas. Needs friable soils.	This species may be near the project sites. There is suitable habitat nearby with sightings throughout the region.
Heartscale	*Atriplex cordulata*	None	None	1B.2	Chenopod scrub, valley and foothill grassland, meadows. Alkaline flats and scalds in the Central Valley on sandy soils at elevations of 1-150 meters.	It is unlikely that this species is in or near the project area due to the high level of disturbance, but has been sighted in the region.
Lesser saltscale	*Atriplex minuscula*	None	None	1B.1	Chenopod scrub, playas, valley and foothill grassland. In alkali sink and grassland in sandy, alkaline soils at elevations of 20-100 meters.	It is unlikely that this species is in or near the project area due to the high level of disturbance, but has been sighted in the region.
Subtle orache	*Atriplex subtilis*	None	None	1B.2	Valley and foothill grassland at elevations of 40-100 meters.	It is unlikely that this species is in or near the project area due to the high level of disturbance, but has been sighted in the region.
Lost Hills crownscale	*Atriplex vallicola*	None	None	1B.2	Chenopod scrub, valley and foothill grassland, vernal pools. In powdery, alkaline soils that are vernally moist with frankenia, atriplex spp. and saltgrass (distichlis spicata) at elevations of 0-605 meters.	It is unlikely that this species is in or near the project area due to the high level of disturbance, but has been sighted in the region.
palmate-bracted bird's-beak	*Cordylanthus palmatus*	Endangered	Endangered	1B.1	Chenopod scrub, valley and foothill grassland. Usually on pescadero silty clay which is alkaline, with distichlis, frankenia, etc. Occurs at the elevation of 5-155 meters.	It is unlikely that this species is in or near the project area due to the high level of disturbance, but has been sighted in the region.
Delta button-celery	*Eryngium racemosum*	None	Endangered	1B.1	Riparian scrub; seasonally inundated floodplain on clay. Ranges in elevation from 3-75 meters.	It is unlikely that this species is in or near the project area due to the high level of disturbance, but has been sighted in the region.
Sanford's arrowhead	*Sagittaria sanfordii*	None	None	1B.2	Marshes and swamps. In standing or slow-moving freshwater ponds, marshes, and ditches. Ranges in elevation from 0-610 meters.	It is unlikely that this species is in or near the project area due to the high level of disturbance, but has been sighted in the region.

Habitat descriptions are from the CNDDB (DFG2007).
*CNPS stands for the California Native Plant Society. Codes stand for: 1B.1 means rare, threatened, or endangered in California and elsewhere; seriously threatened in California;

1B.2 means threatened, or endangered in California and elsewhere; fairly threatened in California.

3.3.2 Environmental Consequences

3.3.2.1 No Action

Under the no action alternative, no ground disturbance would occur and no noise would be generated by equipment use. Therefore, there would be no additional impacts on biological resources.

3.3.2.2 Proposed Action

Under this alternative, the installation of three gages and rehabilitation of two others would result in some minor ground disturbance, very minor loss of open space (i.e. from concrete pad installation) and some generation of noise.

No impacts would occur on federally listed species, on critical habitat, or on essential fish habitat. Avoidance measures would prevent impacts on the arid-adapted species, such as the San Joaquin kit fox, which have a very low chance of occurring in the project area to begin with. It should be noted that this determination of no effect only applies if the preconstruction surveys show no evidence of a kit fox or blunt-nosed leopard lizard in the project area. If there is evidence, the action would not be taken until consultation has been completed with the U.S. Fish and Wildlife Service. The giant garter snake would only be affected by water hyacinth removal at the top of Reach 4B, but based on the field visit findings and inspection of aerial photos and hydrological features, this site does not have connectivity to occupied giant garter snake habitat. Thus, the species is not expected to occur at this site and would therefore not be affected.

Construction at the Merced confluence gage will be done during summer months to avoid the possibility of steelhead presence. Also, prefabricated concrete anchors will be used, so that no fresh concrete can come in contact with water. Thus, the species is not expected to occur at this site and would therefore not be affected. Essential fish habitat for fall-run and late fall-run Chinook salmon does not occur in the project area, because the work site at the Merced confluence is actually upstream of the exact confluence, which is the upstream limit for essential fish habitat on the San Joaquin River. Salmonids can only move upstream of the confluence with the Merced River during cooler wet months, when the Hills Ferry Barrier is removed every December. However, construction would occur during summer months and/or construction would be limited to periods when there is no hydrologic connection between Sack Dam and the lower reaches of the San Joaquin River and there is no possibility of salmonid presence.

Several other special-status species are expected to occur in the project area and would experience some minor effects. The measures incorporated into the project will reduce these effects and prevent any violations of the Migratory Bird Treaty Act and Bald and Golden Eagle Protection Act. These other special-status species are: the western pond turtle, Golden Eagle, Western Burrowing Owl, Red-tailed Hawk, Swainson's Hawk, Northern Harrier, White-tailed Kite, Bald Eagle, Bank Swallow and San Joaquin pocket mouse.

3.4 Cultural Resources

3.4.1 Affected Environment

Cultural resources is a term used to describe both 'archaeological sites' depicting evidence of past human use of the landscape and the 'built environment' which is represented in structures such as dams, roadways, and buildings. The National Historic Preservation Act (NHPA) of 1966 is the primary Federal legislation which outlines the Federal Government's responsibility to cultural resources. Other applicable cultural resources laws and regulations that could apply include, but are not limited to, the Native American Graves Protection and Repatriation Act (NAGPA), and the Archaeological Resources Protection Act (ARPA). Section 106 of the NHPA requires the Federal Government to take into consideration the effects of an undertaking on cultural resources on or eligible for inclusion in the National Register of Historic Places (National Register). Those resources that are on or eligible for inclusion in the National Register are referred to as historic properties.

The Section 106 process is outlined in the Federal regulations at 36 CFR Part 800. These regulations describe the process that the Federal agency (Reclamation) takes to identify cultural resources and the level of effect that the proposed undertaking will have on historic properties. In summary, Reclamation must first determine if the action is the type of action that has the potential to affect historic properties. If the action is the type of action to affect historic properties, Reclamation must identify the area of potential effects (APE), determine if historic properties are present within that APE, determine the effect that the undertaking will have on historic properties, and consult with the State Historic Preservation Office (SHPO), to seek concurrence on Reclamation's findings. In addition, Reclamation is required through the Section 106 process to consult with Indian Tribes concerning the identification of sites of religious or cultural significance, and consult with individuals or groups who are entitled to be consulting parties or have requested to be consulting parties.

Cultural resources in this area are generally prehistoric in nature and include remnants of native human populations that existed before European settlement. Prior to the 18th Century, many Native American tribes inhabited the Central Valley. It is possible that many cultural resources lie undiscovered across the valley. The San Joaquin Valley supported extensive populations of Native Americans, principally the Northern Valley Yokuts, in the prehistoric period. Cultural studies in the San Joaquin Valley have been limited. The conversion of land and intensive farming practices over the last century has probably destroyed many Native American cultural sites

The historic era cultural resources along the Valley are diverse. Many of the historic era resources are related to farming in the San Joaquin Valley. Additionally, many of the urban landscapes have potentially significant architecture and other historic features such as roads, bridges.

3.4.1.1 No Action

The no action alternative will have no change on existing conditions. There will be no undertaking and as result there will be no potential to affect historic properties pursuant to the regulations at 36 CFR Part 800.3(a)(1). As a result there will be no impacts to cultural resource.

3.4.1.2 Proposed Action
The proposed action involves the use of two existing flow monitoring stations (Stations 1 and 2) that are adequate for this projects needs; retrofit two existing flow monitoring stations (stations 3 and 4) with new equipment that will result in no physical change to the facility; and construct two new flow monitoring stations in Reach 4B (Station 5), and one at the Merced River confluence (Station 6). The use of the existing stations has no potential to affect historic properties pursuant to the regulations at 36 CFR Part 800.3(a)(1). The stations that will be retrofitted with new equipment will simply involve the installation of new data collection equipment and will not result in excavation, trenching, or modification of any historic structures and as a result will no potential to affect historic properties pursuant to 36 CFR Part 800.3(a)(1). The construction of the three new stations will be done within existing waterways and significantly disturbed contexts resulting in no potential to affect historic properties pursuant to 36 CFR Part 800.3(a)(1).

Because three elements of the proposed action will have no potential to affect historic properties, there will be no impacts to cultural resources as a result of implementing the proposed action.

3.5 Indian Trust Assets

3.5.1 Affected Environment
Indian trust assets (ITAs) are legal interests in assets that are held in trust by the U.S. Government for federally recognized Indian tribes or individuals. The trust relationship usually stems from a treaty, executive order, or act of Congress. The Secretary of the interior is the trustee for the United States on behalf of federally recognized Indian tribes. "Assets" are anything owned that holds monetary value. "Legal interests" means there is a property interest for which there is a legal remedy, such a compensation or injunction, if there is improper interference. Assets can be real property, physical assets, or intangible property rights, such as a lease, or right to use something. Indian trust assets can not be sold, leased or otherwise alienated without United States' approval. Trust assets may include lands, minerals, and natural resources, as well as hunting, fishing, and water rights. Indian reservations, rancherias, and public domain allotments are examples of lands that are often considered trust assets. In some cases, Indian trust assets may be located off trust land.

Reclamation shares the Indian trust responsibility with all other agencies of the Executive Branch to protect and maintain Indian Trust assets reserved by or granted to Indian tribes, or Indian individuals by treaty, statute, or Executive Order.

3.5.2 Environmental Consequences

3.5.2.1 No Action
Under this alternative, no construction would take place. Therefore, there would be no impacts to any Indian Trust Assets.

3.5.2.2 Proposed Action
The nearest ITA is Table Mt. Rancheria, which is approximately 7 miles NE of the of Friant Dam, therefore the proposed action will not affect Indian Trust Assets.

3.6 Environmental Justice

3.6.1 Affected Environment

Executive Order 12898 (February 11, 1994) mandates Federal agencies to identify and address disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low-income populations.

The population of the Central Valley is presently over 5 million people, and is projected to triple by 2040 (USGS, 1999). The City of Fresno is now the largest city in the Central Valley, and also has the fastest growing population (Table 3). This urban growth has changed the social and cultural framework of the San Joaquin Valley; agricultural lands in the gravel-bedded reach near Fresno are giving way to aggregate mining in the river corridor and to urban expansion in the upland areas, which reduces the agricultural base and increases the urban base. In 1999, the United States Geologic Survey reported that the American Farmland Trust, a national organization that focuses on farmland preservation, has projected a loss of more than one million acres of Central Valley farmland by the year 2040 if current land use conversions continue (USGS, 1999).

As shown on Table 4, urban growth of cities along the Highway 99 corridor is rapidly expanding. For example, the population of Fresno County increased from 529,000 to 799,000 from 1981 to 2000 (US Census Bureau 2000). The demographics of valley communities continue to change as well; both Hispanic and non-Hispanic populations are increasing, with the exception of Merced County where the non-Hispanic population is decreasing slightly.

Table 5: Demographics of Fresno, Madera, and Merced counties, which surround the San Joaquin River study area, change is for the period from 1990 to 2000 (Source: US Census Bureau data, 1999-2000).

County	Total population	Non-Hispanic population	Hispanic population	Percent Hispanic
Fresno – 1990	667,490	431,436	236,034	35.4 %
Fresno – 2000	799,407	447,771	351,636	44.0 %
Numerical Change	+131,917	+16,315	+115,602	
Percent Change	+19.7 %	+3.8 %	+49.0 %	
Madera – 1990	88,090	57,690	30,400	34.5 %
Madera – 2000	123,109	68,534	54,575	44.3 %
Numerical Change	+35,019	+10,844	+24,175	
Percent Change	+39.8 %	+18.8 %	+79.5 %	
Merced – 1990	178,403	120,296	58,107	32.6 %
Merced - 2000	210,500	115,034	95,466	45.4 %
Numerical Change	+32,097	-5,262	+37,359	
Percent Change	+18.0 %	-4.4 %	+64.3 %	

The most notable trend is the very sharp increase in the Hispanic population, as high as 79% for Madera County. The population increase in the State of California follows the trends of the three counties surrounding the San Joaquin River study area, but is not as steep. The

corresponding annual population in California increased from 29,760,021 in 1990 to 3,871,648 in 2000, a 13.8 percent increase.

3.6.2 Environmental Consequences

3.6.2.1 No Action

The No Action alternative would not result in any adverse effects unique to minority or low-income populations in the affected area.

3.6.2.2 Proposed Action

This assessment has not identified any adverse or beneficial effects of the Proposed Action unique to minority or low-income populations in the affected area.

3.7 Cumulative Effects

The implementing regulations of NEPA require federal agencies to evaluate whether a Proposed Action is related to other actions that together would result in a cumulatively significant impact on the environment. Significance exists if it is reasonable to anticipate a cumulatively significant impact on the environment. To determine whether cumulatively significant impacts are anticipated from the Proposed Action, the incremental effect of the Proposed Action was examined together with impacts from past, present, and reasonably foreseeable future actions in the same geographic area.

The implementation of the SJRRP is a reasonably foreseeable action related to the Proposed Action. However, the significant impacts of the SJRRP on the environment would not increase when cumulatively considering the Proposed Action. A Program Environmental Impact Statement/Environmental Impact Report is currently being developed to examine impacts of the entire river restoration program. All impacts, as well as cumulative ones, will be described and examined in that document.

Section 4 Consultation and Coordination

4.1 Fish and Wildlife Coordination Act (16 USC . 651 et seq.)

The Fish and Wildlife Coordination Act requires that Reclamation consult with fish and wildlife agencies (federal and state) on all water development projects that could affect biological resources. The Proposed Action does not involve water development projects. Therefore the FWCA does not apply.

4.2 Endangered Species Act (16 USC . 1521 et seq.)

Section 7 of the Endangered Species Act requires Federal agencies, in consultation with the Secretary of the Interior and/or Commerce, to ensure that their actions do not jeopardize the continued existence of endangered or threatened species, or result in the destruction or adverse modification of the critical habitat of these species.

Reclamation has determined that the Proposed Action will not affect any Federally proposed or listed species or any proposed or designated critical habitat. Therefore, no consultation is required with either the U.S. Fish and Wildlife Service or the National Marine Fisheries Service. This determination is partially dependent upon the results of preconstruction surveys in the project area; if a San Joaquin kit fox or blunt-nosed leopard lizard is detected, the action will not be taken until consultation is completed with the U.S. Fish and Wildlife Service.

Additionally, this determination is based on that construction at the Merced confluence gage will be done during summer months to avoid the possibility of steelhead presence. Also, prefabricated concrete anchors will be used, so that no fresh concrete can come in contact with water. Thus, the species is not expected to occur at this site and would therefore not be affected. Essential fish habitat for fall-run and late fall-run Chinook salmon does not occur in the project area, because the work site at the Merced confluence is actually upstream of the exact confluence, which is the upstream limit for essential fish habitat on the San Joaquin River. Salmonids can only move upstream of the confluence with the Merced River during cooler wet months, when the Hills Ferry Barrier is removed every December. However, construction would occur during summer months and/or construction would be limited to periods when there is no hydrologic connection between Sack Dam and the lower reaches of the San Joaquin River and there is no possibility of salmonid presence.

4.3 National Historic Preservation Act (15 USC 470 et seq.)

Section 106 of the NHPA requires federal agencies to evaluate the effects of federal undertakings on historical, archaeological and cultural resources. The proposed action would have no potential to affect historic properties pursuant to the regulations at 36 CFR PArt 800.3(a)(1). The justification for this determination of effect is located in the cultural resources section of the EA.

4.4 Migratory Bird Treaty Act (16 USC Sec. 703 et seq.)

The Migratory Bird Treaty Act implements various treaties and conventions between the U.S. and Canada, Japan, Mexico and the former Soviet Union for the protection of migratory birds. Unless permitted by regulations, the Act provides that it is unlawful to pursue, hunt, take, capture or kill; attempt to take, capture or kill; possess, offer to or sell, barter, purchase, deliver or cause to be shipped, exported, imported, transported, carried or received any migratory bird, part, nest, egg or product, manufactured or not. Subject to limitations in the Act, the Secretary of the Interior (Secretary) may adopt regulations determining the extent to which, if at all, hunting, taking, capturing, killing, possessing, selling, purchasing, shipping, transporting or exporting of any migratory bird, part, nest or egg will be allowed, having regard for temperature zones, distribution, abundance, economic value, breeding habits and migratory flight patterns.

The Proposed Action will be in compliance with the Migratory Bird Treaty Act.

4.5 Executive Order 11988 – Floodplain Management and Executive Order 11990-Protection of Wetlands

Executive Order 11988 requires Federal agencies to prepare floodplain assessments for actions located within or affecting flood plains, and similarly, Executive Order 11990 places similar requirements for actions in wetlands. The project would not affect either concern.

Section 5 List of Preparers and Reviewers

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