



United States Department of the Interior

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In Reply Refer to:
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Memorandum

To: Program Manager, San Joaquin River Restoration Program, Mid-Pacific Regional Office, Bureau of Reclamation, Sacramento, California

From: Field Supervisor, San Francisco Bay-Delta Fish and Wildlife Office, Sacramento, California 

Subject: Formal Consultation Under Section 7(a)(2) of the Endangered Species Act on the San Joaquin River Restoration Program's Mendota Pool Bypass and Reach 2B Improvements Project.

This memorandum is in response to the U.S. Bureau of Reclamation's (Reclamation) February 24, 2016, request for formal consultation with the U.S. Fish & Wildlife Service (Service) pursuant to section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*) (Act), for the proposed San Joaquin River Restoration Program's (SJRRP) Mendota Pool Bypass and Reach 2B Improvements Project (proposed project). Reclamation's request for consultation was received by the Service on February 24, 2016. Reclamation has requested the Service's concurrence with a determination that the proposed project is not likely to adversely affect the San Joaquin kit fox (*Vulpes macrotis mutica*), blunt-nosed leopard lizard (*Gambelia sila*), palmate-bracted bird's beak (*Cordylanthus palmatus*), California jewelflower (*Caulanthus californicus*), and San Joaquin woolly threads (*Monolopia (=Lembertia) congdonii*). Additionally, Reclamation has determined that the proposed project may adversely affect the giant garter snake (*Thamnophis gigas*), Fresno kangaroo rat (*Dipodomys nitratooides exilis*), and least Bell's vireo (*Vireo bellii pusillus*). This document is issued pursuant to section 7 of the Act.

In 2014, the Service realigned the range of the valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*) (September 17, 2014; 50 CFR 17, 79 FR 55873). The proposed project is no longer considered to be within the range of the listed valley elderberry longhorn beetle, therefore this consultation will not consider the effects of the proposed project to the valley elderberry longhorn beetle.

The Service has reviewed the proposed project and proposed conservation measures, and concurs with Reclamation's determination that the proposed project, as described, is not likely to adversely affect the blunt-nosed leopard lizard, San Joaquin kit fox, California jewelflower,

palmate-bracted bird's beak, and the San Joaquin woolly threads. The Service makes this concurrence because Reclamation has proposed measures (SJRRP 2016) that will avoid and minimize potential effects to these species to a level that is insignificant and discountable. The action area for the proposed project does not contain any federally designated critical habitat, thus no critical habitat will be affected by the project. The remainder of this memorandum represents the Service's biological opinion on the effects of the proposed action on the giant garter snake, the least Bell's vireo, and the Fresno kangaroo rat.

The Service's response is based on: 1) Reclamation's memorandum requesting consultation dated February 24, 2016; 2) the SJRRP Mendota Pool Bypass and Reach 2B Improvements Biological Assessment (BA), February 2016; 3) site visits conducted by the Service and Reclamation staff; 4) June 28, 2016, electronic mail received by the Service from Reclamation; and, 5) additional information on file at the San Francisco Bay-Delta Fish and Wildlife Office. As an Implementing Agency in the SJRRP, the Service has been working closely with Reclamation since early 2008 on project planning and development of avoidance and minimization measures for federally-listed species.

Consultation History

<i>2010 to Present</i>	The Service has participated in bi-weekly Mendota Pool Bypass and Reach 2B Project team meetings since 2010.
<i>November 2011</i>	Reclamation submitted a Programmatic Biological Assessment for the SJRRP.
<i>August 2012</i>	Service issued a SJRRP Programmatic Biological Opinion.
<i>April 2014</i>	Reclamation requested informal consultation for the SJRRP Mendota Pool Bypass and Reach 2B Improvements Project geological investigation.
<i>May 2014</i>	The Service issued a letter of concurrence that the proposed actions were not likely to adversely affect any federally threatened or endangered species (08FBDT00-2016-F-0167). Per the request of Reclamation the Service updated the concurrence letter based on additional information provided by Reclamation.
<i>August 2014</i>	The Service again updated the concurrence letter based on additional information provided by Reclamation.
<i>January – September 2015</i>	Reclamation and the Service conducted meetings regarding consultation on the proposed project on January 14, 2015, January 27, 2015, March 17, 2015, a site visit on May 28, 2015, and September 29, 2015.
<i>December 11, 2015</i>	Reclamation provided a draft Reach 2B BA to the Service for review.

- January 13, 2015* The Service provided Reclamation with comments on the draft BA and met with Reclamation to discuss the comments.
- February 10, 2016* The Service received a letter of initiation and the BA for the proposed project from Reclamation.
- June 28, 2016* The Service received an electronic mail from Reclamation revising the effects determination for the least Bell's vireo and Fresno kangaroo rat from not likely to adversely affect to may adversely affect as a result of proposed survey efforts.

BIOLOGICAL OPINION

Background

In 1988, a coalition of environmental groups, led by the Natural Resources Defense Council (NRDC) filed a lawsuit, entitled *NRDC, et al., v. Kirk Rodgers, et al.*, challenging the renewal of long-term water service contracts between the United States and the Friant Contractors. On September 13, 2006, after more than 18 years of litigation, the Settling Parties, including NRDC, Friant Water Users Authority, and the U.S. Departments of the Interior and Commerce, agreed on the terms and conditions of the Stipulation of Settlement in *NRDC, et al., v. Kirk Rodgers, et al.*, (Settlement) subsequently approved by the U.S. District Court for the Eastern District of California on October 23, 2006. Public Law 111-11 authorizes and directs the Secretary of the Interior to implement the Settlement. The Settlement establishes two primary goals:

Restoration Goal – To restore and maintain fish populations in “good condition” in the main stem San Joaquin River below Friant Dam to the confluence of the Merced River, including naturally reproducing and self-sustaining populations of salmon and other fish.

Water Management Goal – To reduce or avoid adverse water supply impacts on all of the Friant Division long-term contractors that may result from the Interim and Restoration flows provided for in the Settlement.

In accordance with the Settlement, the SJRRP is being implemented by Reclamation, the Service, National Marine Fisheries Service (NMFS), the State of California Department of Water Resources (DWR), and the State of California Department of Fish and Wildlife (CDFW). The SJRRP Implementing Agencies completed the SJRRP Programmatic Environmental Impact Statement/Report and related documents, including the San Joaquin River Restoration Program Biological Opinions, in 2012.

The Mendota Pool bypass and Reach 2B improvements defined in the Settlement are (Settlement Paragraph 11[a]):

- (1) *Creation of a bypass channel around Mendota Pool to ensure conveyance of at least 4,500 cubic feet per second (cfs) from Reach 2B downstream to*

Reach 3. This improvement requires construction of a structure capable of directing flow down the bypass and allowing the Secretary to make deliveries of San Joaquin River water into Mendota Pool when necessary;

(2) Modifications in channel capacity (incorporating new floodplain and related riparian habitat) to ensure conveyance of at least 4,500 cfs in Reach 2B between the Chowchilla Bifurcation Structure and the new Mendota Pool bypass channel.

Since the functions of these channels may be interrelated, the design, environmental compliance, and construction of the two are being addressed as one project. The Project will be implemented consistent with the Settlement and the Settlement Act.

Description of the Proposed Action

The proposed project includes the following features, which are described in more detail below:

- Constructing a channel and structures capable of conveying up to 4,500 cfs of Restoration Flows around the Mendota Pool.
- Constructing structures capable of conveying up to 2,500 cfs from Reach 2B to Mendota Pool.
- Building setback levees capable of conveying flows up to 4,500 cfs with 3 feet of freeboard, and breaching portions of the existing levees.
- Restoring floodplain habitat with an average width of approximately 4,200 feet to provide benefit to salmonids and other native fishes.
- Providing upstream and downstream fish passage for adult salmonids and other native fishes, and downstream fish passage for juvenile salmonids, between Reach 2A and Reach 3.

The proposed project will construct a channel between Reach 2B and Reach 3, the Compact Bypass channel, in order to bypass the Mendota Pool. Restoration Flows will enter Reach 2B at the Chowchilla Bifurcation Structure, flow through Reach 2B, then downstream to Reach 3 via the Compact Bypass channel (Figure 1). The existing Chowchilla Bifurcation Structure will continue to divert San Joaquin River flows into the Chowchilla Bypass during flood operations, and a fish passage facility and control structure modifications will be included at the San Joaquin River control structure at the Chowchilla Bifurcation Structure. This action will also include constructing two new structures in Reach 2B, the Compact Bypass control structure and the Mendota Pool control structure (collectively referred to as the Compact Bypass structures), to divert up to 2,500 cfs to the Mendota Pool. Fish passage facilities will be built at the Compact Bypass control structure to provide passage around the structure when gates are closed during times of water delivery.

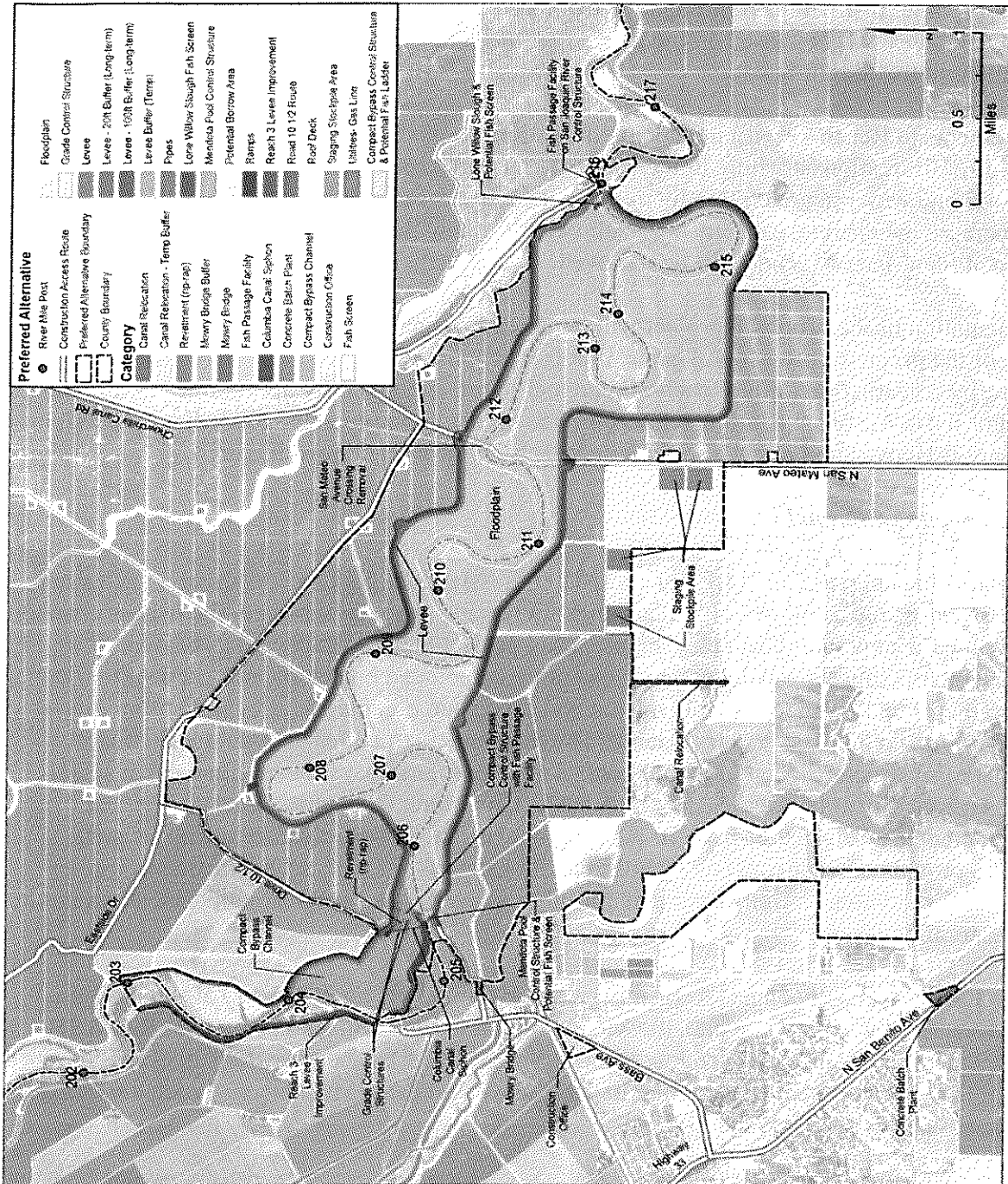


Figure 1
Plan View of Project

Most of the time, fish will pass through the Compact Bypass control structure into the bypass channel and gates will be closed on the Mendota Pool control structure, preventing fish entrainment to the Mendota Pool.

Improvements to Reach 2B will include modifications to the San Joaquin River channel from the Chowchilla Bifurcation Structure to the Compact Bypass structures to provide a capacity of at least 4,500 cfs, with integrated floodplain habitat. New levees will be constructed along Reach 2B to increase the channel capacity while allowing for new floodplain habitat. The existing crossing at San Mateo Avenue will be removed.

Implementation of the proposed project will be phased. Construction of the Compact Bypass portion of the proposed project will occur first from approximately 2017 to 2020 and will be followed by construction of the Reach 2B channel improvements from approximately 2020 to 2025. For these reasons, the project description is divided into separate sections, one describing the Compact Bypass, and one describing the Reach 2B channel improvements.

Compact Bypass Channel

The bypass channel will convey 4,500 cfs around the Mendota Pool by constructing a channel just southwest of the existing Columbia Canal alignment. Once constructed, the bypass channel will become the new river channel. The proposed project includes excavating the bypass channel, constructing setback levees and in-channel structures, breaching existing levees (leaving some segments that provide valuable habitat and seed source in place), relocating or modifying existing infrastructure, and acquiring land. The in-channel structures include the Compact Bypass control structure, Mendota Pool control structure, grade control structures, fish screen, fish passage facility at the Compact Bypass control structure, Columbia Canal siphon and pumping plant, as well as the Drive 10 ½ realignment. The bypass channel and associated structures provide downstream passage of juvenile Chinook salmon and upstream passage of adult Chinook salmon, as well as passage for other native fishes, while isolating Mendota Pool from Restoration Flows.

The bypass channel will connect to Reach 3 about 0.6 mile downstream from Mendota Dam (near River Mile [RM] 204), bypass the Mendota Pool to the north, and connect to Reach 2B about 0.9 mile upstream from Mendota Dam (near RM 205.5). The bypass channel will have a total length of about 0.8 mile. A siphon under the bypass channel will be constructed to connect the Columbia Canal to the Mendota Pool.

The bypass channel will be a multi-stage channel designed to facilitate fish passage at low flows, provide channel stability at moderate flows, and contain high flows. The low flow channel is about 70 feet wide and has an average depth of about 3 feet. It is designed to contain about 200 cfs and is sinuous. The overbank slopes toward the low flow channel. The bank slope of 67 feet horizontal to 1 foot vertical (67H:1V) and a flow of 1,200 cfs is designed to have about 1 foot of depth in the overbank. The overbank slope increases to 20H:1V at a distance of 135 feet from the center of the channel. The floodplain is intended to produce a range of channel depths regardless of the flow.

The elevation of the Compact Bypass control structure is set at 141 feet in order to promote sediment stability throughout Reaches 2 and 3 and minimize the need for grade control in the Compact Bypass channel. Because the entrance to the bypass is located about 7 feet below the current thalweg of Reach 2B, a pilot channel will be constructed to create a smoother transition between Reach 2B and the bypass channel and reduce sedimentation downstream into Reach 3. The pilot channel will be a 70-foot-wide channel with 2H:1V side slopes. It will be excavated within Reach 2B, upstream of the junction between the bypass and San Joaquin River. The excavation will be performed just prior to the reintroduction of high flows to the bypass so that sediment does not refill the channel. Some of the material excavated from the pilot channel could be placed in the bed of the low flow channel located in the bypass to a maximum depth of 1 foot.

The Compact Bypass channel, designed as an unlined earthen channel, will be about 4,000 feet long with a total corridor width of 510 feet. The average slope of the channel would be 0.0005 (2.6 feet per mile), while the total elevation drop in the Compact Bypass after channel stabilization would be about 2 feet. Two grade-control structures just downstream of the Compact Bypass control structure will be included to achieve the necessary elevation change. Channel complexity is incorporated as appropriate per the Rearing Habitat Design Objectives (SJRRP 2014).

Grade Control Structures

There will be two grade control structures designed as rock ramps per the Rock Ramp Design Guidelines (USBR 2007) and Hydraulic Design of Flood Control Channels, EM 1110-2-1601 (1994). One will be located immediately downstream of the Compact Bypass control structure. The second grade control structure will be located near the Columbia Canal siphon crossing. The siphon crossing will be located underneath the second grade control structure so that the grade control structure will also serve to protect the siphon crossing. Each grade control structure will have 0.4 feet of drop across it. Each structure will have a maximum downstream slope of 0.04 and be a minimum of 25 feet in length in the streamwise direction. Two filter layers will be constructed underneath the rock ramps, one of gravel and one of sand. Rocks will be about 12 inches in diameter. Each grade control structure will extend across the main channel and key into the overbanks to protect against flanking, resulting in a total structure width of about 270 feet.

Bank protection measures will be incorporated into the bypass between the Compact Bypass control structure and the downstream most grade control structure, totaling about 500 linear feet of bank protection on either side of the Compact Bypass channel. Downstream of the grade control structure, no bank protection would be necessary after establishment of riparian vegetation. Bank protection measures may include: vegetated revetment, rock vanes, bioengineering techniques, and riparian vegetation. It is assumed that the vegetated revetment would consist of buried riprap of approximately 12 inches in diameter, covered with topsoil, erosion control fabric, and native woody vegetation, so that fish would experience natural channel banks. Rock vanes would be constructed to only interact with the flow if erosion occurs (i.e., the top of the vane will be level with the constructed overbank surface). Bioengineering techniques could include vegetated geogrids, fabric encapsulated soil banks, brush mattresses,

and root wads. Native woody vegetation directly upstream, downstream, and adjacent to the grade control structures would provide shading and opportunities for juvenile salmonids to hide from predators.

Compact Bypass Structures

Two control structures will be constructed at the upstream end of the Compact Bypass: one across the path of Restoration Flows (Compact Bypass), also known as the Compact Bypass control structure, and one across the path of water deliveries to Mendota Pool (San Joaquin River), also known as the Mendota Pool control structure. The Compact Bypass control structure includes a fish passage facility on the side of the structure (i.e., the Compact Bypass Fish Passage Facility) and the Mendota Pool control structure may include a fish screen upstream of the structure (i.e., the Mendota Pool Fish Screen), if appropriate. Each control structure will be placed in the middle of the channel and has earthen embankments, which are designed as dams as they may have water on both sides, connecting the structure to the proposed levees. A 16-foot-wide roadway and 20-foot-wide maintenance/operations platform will be provided over each control structure.

Compact Bypass Control Structure

The Compact Bypass control structure will be designed to accommodate up to 4,500 cfs and will consist of eight 14-foot-wide bays. Conditions in this control structure will be designed based on the *Guidelines for Salmonid Passage at Stream Crossings* (NMFS 2001) and *Anadromous Salmonid Passage Facility Design* (NMFS 2008) fish passage criteria. The bays will be outfitted with radial gates. About 95 percent of the time, fish and Restoration Flow will pass through this structure and all gates will be open.

When deliveries are occurring, most of the gates of the Compact Bypass control structure will be shut nearly all the way. The water surface elevation will increase by several feet on the upstream side of the structure. The gates of the Mendota Pool control structure will open and water will be delivered to Mendota Pool. In the delivery situation, fish and Restoration Flows will pass primarily through the fish passage facility, described below. Water that passes through the Compact Bypass control structure will be forced through a small opening, and a hydraulic jump will form downstream of the structure. A stilling basin will be located on the downstream side of the Compact Bypass control structure to contain the hydraulic jump that will form when deliveries are occurring to Mendota Pool.

Mendota Pool Control Structure

The control structure across the San Joaquin River (the path of the water deliveries) will be designed to accommodate up to 2,500 cfs. The structure will have twelve bays that are 10 feet wide, and will contain slide gates to control the flow of water rather than radial gates, since Mendota Pool will be impounded on the downstream side of the structure at all times. Guides for stop logs will be provided in all bays to allow for maintenance. A 5-foot barrier wall may be added to the upstream side of the structure in several decades, to allow continued operation with subsidence.

Compact Bypass Fish Passage Facility

The Compact Bypass control structure (across the Restoration Flow path) includes a fish passage facility. The fish passage facility will be necessary to provide passage during water deliveries. The design of the fish passage facility is a vertical slot ladder with a sloped bottom, with about 12H:1V slope, 12 feet of drop across the fish passage facility, and about 3 feet of flow depth. Fish will only pass through this facility when deliveries are occurring to Mendota Pool, which will amount to about 5 percent of the time when fish could be present. About 95 percent of the time, fish will migrate through the Compact Bypass control structure bays under the open gates.

Drive 10 ½ Crossing

The Compact Bypass channel will cross existing Drive 10 ½, which provides access for the operations and maintenance of Mendota Dam. To continue the current level of access, the road will be rerouted along the bypass channel levees and cross the head of the bypass channel at the proposed Compact Bypass control structure. A road deck will also be provided over the fish passage facility adjacent to the control structure. The road will be designed for HS-20/HL-93 loading (e.g., sufficient to allow transport of a 25-ton maintenance crane to Mendota Dam).

Columbia Canal Facilities

The Columbia Canal water intake facility will be located in Mendota Pool, and likely will consist of 15-foot-wide, 7-foot-tall bays, with a bar screen to prevent aquatic vegetation entering the siphon. Intake bays will be 7 feet tall to account for 5 feet of subsidence. Existing water surface elevations in Mendota Pool will rise to approximately 2 feet above the intake crest elevation. The bar screen will be cleaned by an automatic trash rake. A sediment sump will be provided in the center bay to allow for sediment removal. The top of the intake facility will be covered with grating to allow for easy access for maintenance.

The Columbia Canal siphon will cross underneath the Compact Bypass channel from the intake facility on Mendota Pool to the pumping plant located near the existing Columbia Canal, about 1,000 feet. The siphon will be two adjacent 4-foot by 6-foot concrete box culverts, that will be buried a minimum of 5 feet below the low flow channel in the Compact Bypass. The discharge facility for the Columbia Canal siphon will be located where Drive 10 ½ crosses the Columbia Canal, on the north side of the future Compact Bypass. The pumping plant will be located adjacent to this facility. The Columbia Canal intake facility and pumping plant will be constructed with SCADA (supervisory control and data acquisition) capability, but able to be manually operated as well. The pumping plant will include a steel plate door and cinder block walls and will be enclosed within a fenced and gated area to minimize vandalism.

Electronics Building

A separate, 12-foot by 10-foot electronics building will house power controls for trash rack cleaning systems, fish monitoring equipment, SCADA, etc. The building will be located adjacent to the Columbia Canal pumping plant, or on the other side of the Compact Bypass near the Mendota Pool control structure. The building will include a steel plate door and cinder block walls and be enclosed within a fenced and gated area to minimize vandalism.

Mendota Pool Fish Screen

A fish screen may be included adjacent to the head of the Compact Bypass, at the Mendota Pool Control Structure, where water deliveries will be diverted from the river to Mendota Pool, if appropriate. The fish screen would keep or return out-migrating juvenile salmon to the Compact Bypass (the path of Restoration Flows) during water deliveries. The Compact Bypass structures are only operated for Exchange Contractor diversions in summer months in highly infrequent dry years or during flood flow deliveries, when flows split several times before entering Mendota Pool and fish survival through the bypasses is high.

The screen would be designed to pass flow up to 2,500 cfs. The type of fish screen could be a fixed flat plate in “V” configuration, vertical flat plate, inclined flat plate, cone, or cylindrical screens. Depending on the design type, the fish screen facility may include trash racks, stainless steel wedge wire fish screens, flow control baffle systems behind the screens, screen cleaning systems for the trash racks and screens; bypass flow control weirs, fish-friendly pumps, and/or fish bypass pressure pipelines. The trash racks would be installed at the entrance to the screen structures to protect screens from trash, logs, and other large debris.

Approach, sweeping, and bypass entrance velocities would be kept within established fish screen criteria (NMFS 2008). Flow through the fish screens may be controlled by baffles behind the fish screens. Cleaning of the screens would be accomplished using an automated brush system. Electric power would be needed for fish friendly pumps, if included, and screen cleaning systems. Operation of the fish screens would include methods to reduce predation of juvenile fish (e.g., noise systems to scatter predators, netting, and periodic draining of the screen return pipes).

Floodplain and Riparian Habitat

The proposed project includes a mixture of active and passive riparian and floodplain habitat restoration and floodplain compatible agricultural activities. Active restoration planting of native riparian species will occur along both banks of the low flow channel of the river up to 450 feet from the bank, and will be irrigated with a planting density of approximately 545 plants per acre. In accordance with the Rearing Habitat Design Objectives, it will include native species that will provide shade and reduce air temperatures to help minimize water temperatures, provide large woody debris and organic matter needed to provide habitat and food, and help stabilize the low-flow channel. The irrigated area will include 16-foot spacing between irrigation lines for equipment access and 5-foot spacing along irrigation lines to maximize density. Forbs and grasses will be planted as plugs or transplants in between irrigation lines in order to encourage structural diversity. Some areas may be passively revegetated by creating riparian establishment areas that provide a riparian seed bank of native species. The remaining areas will be seeded with native grasses and forbs to minimize erosion and to help control invasive species. These upland areas will be broadcast seeded or drilled with incorporation as necessary. Active revegetation activities will include a combination of seeding, transplanting, and pole/live stake plantings. Plantings may be designed as either clusters of trees and shrubs with larger areas of seeded grasses and forbs or as dense forests. Spacing and alignment of plantings will take into account species growth patterns, potential equipment access needs for monitoring and

maintenance, and desired future stand development. Passive restoration will occur in areas that rely on Restoration Flows for additional vegetation recruitment. Natural riparian recruitment (passive restoration) will promote continual habitat succession, particularly in areas where sediment is deposited or vegetation is removed by natural processes. Emergent wetlands and water tolerant woody species of riparian scrub will be selected for development within the main channel, woody shrubs and trees with an herbaceous understory will be selected for development along the main river channel banks, and bands of other habitat types (e.g., grasses) will be selected for development at higher elevations along the channel corridor. Active vegetation restoration will occur following construction and these areas will be irrigated and managed as necessary during the establishment period. Phased implementation of active vegetation restoration at strategic locations may occur concurrently with phased implementation of construction and physical infrastructure.

Agricultural practices (e.g., annual crops, pasture, or floodplain-compatible permanent crops) may occur on the floodplain in previous agricultural areas outside of State-owned and public trust lands. Growers would be required to leave cover on the ground and would be required to develop and implement a water quality plan, approved by Reclamation, to meet current water quality standards for aquatic resources and coldwater fisheries, as well as meeting the specific needs for anadromous fishes in adjacent and downstream areas. If grazing is conducted, the lessee would be required to develop and implement a Grazing Plan, approved by Reclamation and the Service, in addition to the Water Quality Plan.

Existing Native Vegetation Protection

The existing native vegetation in the Action Area designated to remain will be temporarily fenced with orange exclusion fencing (or equivalent) to prevent entry, driving, parking, or storing equipment or material within these areas during construction. Existing vegetation will be left in place or only minimally trimmed to facilitate access and work at the site. The existing soil is suitable for growing all of the desired native plants. In order to maximize plant growth and planting success, existing soil and topsoil will be preserved, and in areas where excavation is required, will be stockpiled to later place on top of the excavated bypass channel for planting. If the soil contains invasive non-native seed or fragmented stems and rhizomes, it will not be preserved. Native vegetation likely to provide a good seed source or wildlife habitat will be preserved where practicable.

Invasive Species Control

Invasive, non-native species will be removed from the Action Area during the installation, plant establishment and maintenance periods. Invasive species management will consist of removal of the most invasive non-native species within the reach such as giant reed grass (*Arundo donax*), perennial pepperweed (*Lepidium latifolium*) and poison hemlock (*Conium maculatum*). Invasive species management will also include removal of other invasive species that are currently found in upstream reaches and may eventually colonize in the Action Area such as red sesbania (*Sesbania punicea*), salt cedar (*Tamarix* spp.), and Chinese tallow (*Sapium sebiferum*). Invasive plant removal techniques may include mechanical removal, root excavation, hand pulling, mowing, disking, controlled burning, grazing, aquatic-safe herbicides, or a combination of techniques as appropriate.

The SJRRP has an existing invasive species management plan, and completed the *Invasive Vegetation Monitoring and Management Environmental Assessment* in 2012 that describes the methods that would be followed for Reach 2B invasive species removal (SJRRP 2012).

Temporary Irrigation System and Water Supply

Proposed plantings that are wetland species or borderline wetland species will need regular aboveground irrigation (typically April through October) during their establishment period (typically 3 to 5 years depending on rainfall conditions and the plants' growth rates and vigor). The amount of water needed is estimated to be about 2.4 acre feet per year. An extensive temporary aboveground irrigation system, such as aerial spray, will provide water for the plants several times a week during the hot months of the year. If an aerial spray irrigation system is installed, the irrigation distribution piping would be installed aboveground and anchored to the ground so that it would not be damaged during high flows inundating the floodplain. If an aerial spray system is used, sprinkler heads would likely be installed on braced standpipes so that their irrigation stream would not be blocked or diverted by growing vegetation. The irrigation system would be disassembled and removed at the end of the establishment period.

The SJRRP will pursue options for irrigation water supply, including groundwater wells or water pumped from the river with portable, skid-mounted, diesel- or gas-powered pumps and stored in tanks. Additionally, purchases from willing sellers may be required to withdraw water from the river or other nearby water sources (e.g., Mendota Pool). If water is pumped from the river, the amount of water diverted would be controlled so that river water temperatures do not increase and passage for salmonids is not impaired. The diversion from the river would also be screened if necessary to prevent entraining juvenile salmonids.

Maintenance and Monitoring

Maintenance and monitoring will be conducted following revegetation for 10 years, yearly for the first 3 years, every other year until year 7, and a final assessment at year 10. Monitoring activities include monitoring of the installed plants for drought stress and overwatering, identification of competitive, invasive, non-native species for removal, identification of diseased, dead and washed-out plants, irrigation system function, and identification of trash and debris for removal. Maintenance activities will include controlling invasive plant species, mitigating animal damage, irrigation, replacement of diseased, dead, or washed-out plants, irrigation system maintenance, and removal of trash and debris. Animal damage to newly planted or germinated vegetation may be alleviated with screens, aquatic-safe chemical deterrents which will be implemented in accordance with the requirements and recommendations of the California Department of Pesticide Regulation's PRESCRIBE (Pesticide Regulation Endangered Species Custom Real-time Internet Bulletin Engine) database, or other exclusion methods.

Temporary irrigation of wetland and riparian areas during establishment, especially if precipitation is below normal, will facilitate root system development into the alluvium groundwater. Irrigation infrastructure will need to be installed and remain in place for at least 3 years. The irrigation system will be used each year on a biweekly to daily basis during the hot part of the growing season. The landscape contractor will be required to regularly check the integrity of the system and make sure that system is not clogged or damaged. Upland areas will be seeded in the fall before the winter precipitation season, and it is likely that these areas will

become established to an acceptable level after one season of normal precipitation (there may be more than one active revegetation effort required to establish a dense riparian corridor necessary to naturally stabilize the Compact Bypass channel). Removal of trash and debris from the restoration areas on both sides of the river will be performed on an as-needed basis for the duration of the entire monitoring period. Monitoring is anticipated in years 1, 2, 3, 5, 7, and 10 after planting; after 10 years of monitoring and replacement as necessary, vegetation should be established.

Long-Term Management

While it is not anticipated that major management actions will be needed, the key objective of management will be to monitor and identify any environmental issues that arise, and use adaptive management to determine what actions would be most appropriate to correct these issues.

The general management approach to the long-term maintenance of the floodplain areas will be to maintain quality habitat for each natural resource, with on-going monitoring and maintenance of key environmental characteristics of the entire floodplain area within the reach. An adaptive management approach will be used to incorporate changes to management practices, including corrective actions as determined to be appropriate by Reclamation and/or the California State Lands Commission. Adaptive management includes those activities necessary to address the effects of climate change, fire, flood, or other natural events, force majeure, etc.

The expected long-term management needs (and activities necessary to maintain any on-site mitigation sites) would be:

- Resource specific long-term maintenance activities and other general maintenance activities such as exotic species elimination, grazing management, clean-up and trash removal;
- Infrastructure management such as gate, fence, road, culvert, signage and drainage-feature repair; and
- Other maintenance activities necessary to maintain the riparian and floodplain habitat quality.

These activities are expected to continue for the life of the SJRRP.

Floodplain and Channel Grading

Floodplain and channel grading will be included with the proposed project. Floodplain and channel grading will include any or all of the following at locations to be determined during design:

- Creating high-flow channels through the floodplain to increase the inundation extent at lower flows.
- Connecting low-lying areas on the floodplain to the river to prevent stranding.
- Removing high areas where flow connectivity would be impeded (e.g., farm road grades).

- Excavating floodplain benches adjacent to the river channel to increase the frequency of inundation.
- Creating greater inundation depth diversity on the floodplain.
- Excavating channels in portions of the Action Area to tie into existing elevations upstream and downstream of the proposed project or to create desirable sediment transport conditions.

Levees

Set-back levees will be required within the proposed project limits to contain Restoration Flows. While the height and footprint of the levees vary according to their location along the channel and the ground elevation, the capacity, freeboard, and cross-section will be consistent. Localized backwater and redirection effects at proposed project structures will be considered during design of levee heights. Levees will be designed to maintain at least 3 feet of freeboard on the levees at 4,500 cfs. Levee design will be based on the U.S. Army Corps of Engineers (Corps) *Engineer Manual 1110-2-1913 Design and Construction of Levees guidelines* (Corps 2000) and *Engineer Technical Letter 1110-2-583 Guidelines for Landscape Planting and Vegetation Management at Levees, Floodwalls, Embankment Dams and Appurtenant Structures* (Corps 2014) which will be integrated into project design to the extent feasible, but will be adapted, as appropriate, for the habitat restoration effort. The SJRRP intends that levees be planted with native grasses, excluding woody vegetation. The design includes seepage control measures, maintenance roads, and inspection and drainage trenches to direct off-site drainage where required.

Levee alignments maintain a 300-foot buffer zone, where appropriate, between the levee and river channel to avoid impact to levees over time due to potential channel migration. In areas where a minimum 300-foot buffer zone between the main river channel and levee cannot be maintained, bank revetment will be incorporated in the design.

New levees will be designed to have sideslopes of 3 horizontal to 1 vertical (3H:1V) on the waterside and landside. A maintenance road and surface drainage ditch will also be included. Surface drainage ditches will only be intended to capture and direct runoff; they are not intended to address groundwater seepage or through-levee seepage. By following the Corps standards, all levees will have an inspection trench or include a cut-off wall. Additional data collection and analysis will be required to verify the groundwater conductivity rates of the *in situ* and borrow soils and to finalize the design of seepage control measures.

The levee alignments may be adjusted during final design. Adjustments may be made for several reasons, including: to improve flow conditions on the floodplain; to improve habitat conditions on the floodplain; to reduce potential erosion; to accommodate adverse soil conditions; and to avoid existing infrastructure. The final levee alignments will be within the impact areas described in the project description of the BA (SJRRP 2016).

Levee and Structure Protection

The proposed project will generally provide a minimum 300-foot buffer between the existing channel and the proposed levee. For locations where the 300-foot buffer is not included, erosion protection for the levee in the form of revetment will be included. The revetment will be riprap

material covered by soil and then planted to provide a vegetated surface. However, softer approaches, such as bioengineering or dense planting, may be considered during design depending on velocities and scour potential. Locations that require revetment include areas where the 300-foot buffer is not included due to the proximity of existing infrastructure, near proposed structures, and along river bends less than 300 feet from the levee in areas that have the potential to erode.

Channel Bank Protection

The proposed project may include riparian vegetation, rock vanes, woody materials, revetment, or other measures designed to protect channel banks from erosion. Bank protection measures will be installed in locations determined to be susceptible to and likely to experience bank erosion.

Removal of Existing Levees

Removal of portions of the existing levees is included and designed to expand the inundation area of the floodplain out to the proposed levees and improve connectivity between the river channel and proposed floodplain. The locations of existing levee removal will be based upon the hydraulic performance of the channel and floodplain. In certain locations, however, highly desirable existing vegetation (native and sensitive vegetation communities that can serve as seed banks for future vegetation communities) can be found on the existing levees. Where hydraulic performance and connectivity of the floodplain would not be negatively affected, portions of the existing levees with highly desirable vegetation will remain in place. Materials that are removed from the existing levees will likely be reused within the Action Area.

Seepage Control Measures

Seepage of river water through or under levees is a concern for levee integrity and adjacent land uses. Through-seepage, water that seeps laterally through the levee section, will be addressed through proper levee design and construction (e.g., selection of low porosity materials and proper compaction). Under-seepage, water that seeps laterally by travelling under the levee section, is primarily controlled by the native soils beneath the levee and seepage control measures will be included where native soils do not provide sufficient control. Seepage control measures will be included, as necessary, in areas where under-seepage is likely to affect adjacent land uses. Seepage control measures may include: cut-off walls, interceptor drains or ditches, seepage wells, seepage berms, seepage easements and other measures that can be implemented within the Action Area.

Infrastructure for Fish Monitoring

The designs for control structures, fish passage facilities, and fish screens include security fences and gates, mounting hardware, and electrical supply in order to conduct fish monitoring activities. Fish monitoring activities are expected to include connections for PIT (passive integrated transponder) tag arrays at the Compact Bypass control structure and the San Joaquin River control structure at the Chowchilla Bifurcation Structure and Didson camera mounts at the edges of the Compact Bypass control structure and San Joaquin River control structure, as well as a vault and connection for a visual fish imaging technology in the Compact Bypass fish ladder. Acoustic tagging receivers can be placed at various locations within the reach and anchor points will be provided at structures, where appropriate.

Existing Infrastructure Relocations or Floodproofing

Existing infrastructure such as groundwater wells, pumps, electrical and gas distribution lines, water pipelines, and canals located in the Action Area require relocation, retrofitting, or floodproofing to protect the structures from future Restoration Flows and increased floodplain area. Although the relocations, retrofits, and floodproofing are included as part of the proposed project, the actual relocation, retrofit, or floodproofing work may be performed by others. As a result of the proposed project, some existing infrastructure may be unnecessary in the future (e.g., power lines that service pumps relocated to outside the proposed project limits). In these cases, infrastructure may be demolished or abandoned in place.

Specific plans for relocations, where known, are identified below:

- Natural gas pipelines will be buried lower in the soil column to avoid interference with construction activities.
- Water pipelines will be either buried lower in the soil column or relocated outside of levees but within the Action Area.
- City of Mendota's three groundwater wells will remain in place. Two of them are outside of the levee alignments and will remain unaffected. The third well is immediately adjacent to the San Joaquin River and will be floodproofed, with the adjacent levee extending to protect the well.
- The Mowry Bridge, which holds the City of Mendota's water pipeline, will be replaced for construction access and the water pipeline will be replaced across the new bridge.

Electrical and Gas Distribution

Approximately 48,500 feet of electrical distribution lines and 11,000 feet of gas distribution lines have been identified for possible relocation. Information from Pacific Gas and Electric Company is available for portions of the area in Geographic Information System (GIS) shapefile format and was supplemented by field data. At the current level of design, it is assumed that a portion of the existing electrical and gas distribution lines found within the Action Area will need to be replaced and/or excavated and buried lower in the soil column. Three gas pipelines are buried under the San Joaquin River in this reach. They will need to be re-buried deeper or floodproofed. This may involve trenching and excavation along the pipeline length, within and outside of the future floodplain area to re-bury it deeper in the soil column below any potential impacts from floodplain grading within the Action Area.

Canals and Drains

Approximately 31,500 feet of canals have been identified for possible relocation. On-farm canals and drains are visible on the light detection and ranging (LiDAR) imagery (CVFED 2009) and/or identified during on-site field meetings with landowners and have been quantified. No canals or drains outside the proposed project footprint have been identified for redesign. Some portions of canals and drains could be discontinued in the future; the extent of discontinued and replaced canals will be considered during landowner negotiations. No subsurface drains were able to be quantified; however, some are believed to exist within the area.

Lift Pumps

Ten lift pumps have been identified for possible relocation. Lift pumps visible on the LiDAR imagery (CVFED 2009) or noted in the CalFish Passage Assessment Database (CalFish 2014) are assumed to require relocation to new facilities on the edge of the proposed levees. A pilot channel dug from the low flow river channel to the intake of the relocated pumps is also assumed. Locations in the CalFish Passage Assessment database have been confirmed using the LiDAR imagery when possible.

Groundwater Wells

Thirty-two (32) groundwater wells have been identified for possible flood-proofing or relocation, including the city of Mendota groundwater wells. Wells were identified within the area using aerial photography. During design, the DWR well database will be consulted to find abandoned wells that have not been destroyed, so that these old wells can be filled in to prevent a flood water conduit to the groundwater. A formal well canvas will also be conducted. Floodproofed wells will be provided with year-round vehicular access via a raised roadbed across the floodplain. The roadbed may include multiple culverts to support floodplain connectivity, depending on the length of the access road and its effect on floodplain flows. Wells relocated by the proposed project will provide equal utility. Wells taken out of service by the proposed project will be abandoned in accordance with U.S. Environmental Protection Agency (EPA), DWR, and/or local regulations.

The levee alignment has been designed so that two of the city of Mendota's three groundwater wells will be outside of the levees and floodplain area, and unaffected by the proposed project. The remaining well is inside the levee and right next to the river, and will be flood-proofed. The setback levee will be extended around the groundwater well to allow access and prevent flooding.

Oil and Gas Wells

Two closed or active oil and gas wells have been identified within the Action Area for potential closure, relocation, or buyout. If active oil and gas wells cannot be avoided, the destruction or closure of those wells will be conducted in accordance with the California Department of Conservation, Division of Oil, Gas, and Geothermal Resources regulations.

Other Utilities

Other infrastructure has been identified within the Action Area. These other facilities include high voltage transmission lines and water pipelines. High voltage transmission lines are assumed to be high enough to not be impacted. Water pipelines have been quantified from existing maps and discussions with landowners. Water pipelines may be relocated or abandoned depending on their future use requirements. The city of Mendota has a water pipeline from their three groundwater wells that crosses Mowry Bridge. This pipeline may need to be modified as the setback levee will cross it, and Mowry Bridge will likely need replacement for construction access. Service line crossings (e.g., gas, water, electrical) will be considered during levee design.

Construction Access

Access for vehicles carrying materials, equipment, and personnel to and from the construction area would be provided via several existing roadways in the proposed project vicinity. Improvements may be required to upgrade roadways, pavements, and crossings for anticipated construction traffic and loads, provide adequate turning radii and site distances, or to control dust on non-paved roads. Anticipated improvements include:

- Eastside Drive – Approximately 0.6 mile of dirt road starting at Road 10 ½ will likely require overlaying and the implementation of dust control measures.
- Chowchilla Canal Road/Road 13 – Approximately 0.3 mile of road starting at Eastside Drive will likely require some overlaying and the implementation of dust control measures.
- San Mateo Avenue – Approximately 0.5 mile of gravel and 1.5 miles of oil-dirt road starting at the existing San Joaquin River levees will likely require some overlying and the implementation of dust control measures.
- Bass Avenue Canal Crossings – These crossings may need additional bracing and shoring to ensure that they will be able to support the load of the construction equipment and activities. All the construction equipment on Bass Avenue will be within the legal loads. This crossing is on the Fresno County replacement list.
- Delta-Mendota Canal Crossing – This crossing may need additional bracing and supports to ensure that it will be able to support the load of the construction equipment activities.
- Mowry Bridge – This bridge will need replacement as it is currently condemned due to beaver activity. It would provide convenient access to the site of the Mendota Pool control structure.

Dust control measures for non-paved roads may include the use of water trucks, palliative, or gravel placement where necessary. Legal loads would be used on all roads, and once construction is completed, the roads would be returned to the same condition as they were prior to the Project.

Revegetation of Temporary Disturbance Areas

Areas temporarily disturbed during construction will be restored to their previous contours, if feasible, and then seeded with a native vegetation seed mixture to prevent soil erosion. Some areas, such as borrow areas, may not be feasible to restore to previous contours, but these areas will be smoothed and seeded. Staging and borrow areas will occur on annual cropland or land purchased for the proposed project and not on permanent cropland outside of the proposed project levees.

Structure Design and Subsidence

All design work will be completed in general accordance with Reclamation Design Standards, applicable design codes, and commonly accepted industry standards. Where design criteria are missing for a specific project element, either Reclamation will be consulted for design specifications or standard engineering practice methods will be employed.

In addition, ground subsidence effects are anticipated to be experienced in the Action Area. Based on subsidence data collected from December 2011 to July of 2015, Reclamation is designing the proposed project for 5 feet of subsidence, which is equal to the current rate for 25 years. In 2042 (25 years from the start of construction of this proposed project) the Sustainable Groundwater Management Act requires Groundwater Sustainability Agencies to have reached sustainable levels of withdrawal in all State groundwater basins, presumably meaning subsidence will have stopped. Methods to mitigate this anticipated ground subsidence include additional freeboard on levees, additional height of control structures and intake facilities, and additional stoplogs or concrete walls to maintain the same low flow elevation after years of subsidence on control structures.

Geotechnical Investigations

Geotechnical investigations are required to evaluate soil suitability for final design of the proposed project and may be required to conduct monitoring of seepage after construction of the proposed project. Geotechnical investigations may include hydraulic conductivity tests, soil sampling, soil salinity testing, and installation of monitoring wells, back-hoe pits, standard penetration tests, cone penetrometer tests, or other forms of geotechnical investigations.

Surveys

Biological, cultural resources, and elevation surveys are required to complete final design of the proposed project and conduct post-project monitoring. Surveys may include vegetation surveys and mapping, habitat assessment and protocol-level species surveys, bathymetry surveys, elevation surveys, digging of cultural resource inspection trenches, water quality sampling, or any other surveys required for environmental compliance, permitting, design data collection, or monitoring activities.

Construction Considerations

The total construction timeline for the proposed project is estimated to range from 106 to 157 months (9 to 13 years); the Compact Bypass portion of the project is expected to be completed in the first 3 years.

Soil improvements for possible liquefiable soils may be required to protect proposed structures from damage or failure during an earthquake. All proposed structures will be designed to account for potential liquefaction. Soil improvements may include removing and replacing soils with adequate materials, injecting soil-cement slurry, vibrofloatation, dynamic compaction, structural foundation piles (stone or reinforced concrete), and other techniques (USBR 2016).

Flow in the San Joaquin River, operations at the existing Mendota Dam, operations at the Chowchilla Bifurcation Structure, and operation of the existing Columbia Canal will be maintained during construction activities. The majority of the Compact Bypass channel will be constructed without interruption to the San Joaquin River flow or the Columbia Canal, by conducting the excavation during the dry period and constructing the Compact Bypass control structure last.

The construction of the Mendota Pool control structure across the existing river channel will require removable cofferdams in two phases to facilitate the construction without blocking the flow. If flow is present in the river during the construction period, flow will be diverted around the work area via a temporary diversion pipe or canal and fish passage will be provided.

Cofferdams include two rows of braced sheet piling filled with dirt for stability and seepage control. The total height of the cofferdam is assumed to be 24 feet of which 12 feet will be above the channel bed.

Stone slope protection (riprap) will be provided on the upstream and downstream slopes of the control structure embankment including some portions of the side slopes of the channel itself to prevent scouring. Riprap will be placed on bedding over geotextile fabric. Riprap will be filled with soil and planted with native vegetation.

Construction of the fish screen, which is located in the San Joaquin River, will require removable cofferdams in two phases to facilitate the construction without blocking the flow. The exception to this is the return/bypass fish pipes and outlet, which will take place in the dry period using conventional construction methods.

For construction of the control structures and fish passage facilities, it will be necessary to maintain a minimum flow during construction during fish migration periods; the amount or range of flows during construction has not yet been identified. The construction of the Compact Bypass channel will be undertaken during the dry period. The levee between the Compact Bypass and the Mendota Pool will be one of the first components constructed, as it includes a cement-bentonite wall that will assist in dewatering the rest of the site. The cement-bentonite wall will extend around the site of the Compact Bypass control structure on existing land, providing dewatering for the construction of the Compact Bypass control structure as well. Soil will remain in the location of the Compact Bypass control structure until the entire bypass is graded, levees are constructed, and the bypass is revegetated, at which time the Compact Bypass control structure will be constructed. The pilot channel will be excavated when the Mendota Pool control structure is complete and flows will start passing through the Compact Bypass.

Operations and Maintenance

The proposed project includes long-term operations and maintenance of the proposed facilities and features as described below.

Maintenance

Levees will require maintenance for vegetation management, access roads, levee inspections, levee restoration, rodent control, minor structures, encroachment removal, levee patrolling during flood events, and equipment. Levee vegetation management includes equipment to drag or mow the levee banks or aquatic-safe herbicide applications. Maintenance of access roads includes replacing gravel or scraping and filling of ruts to keep the roads in good condition. Levee restoration includes restoring areas with erosion or settlement problems or adding armor.

Rodent control includes setting traps with bait and periodically checking the traps. Minor structures maintenance includes repair or replacement of gates, locks or fences. Encroachment removal involves removing illegally dumped materials.

Floodplain maintenance includes vegetation management for invasive species, periodic floodplain and channel shaping to retain capacity and prevent fish stranding, and other floodplain maintenance activities such as debris removal and repair of channel banks and bank protection measures.

Control structures maintenance includes annual operating maintenance for control gates, lubricating the fittings, greasing and inspecting the motors, replacing parts and equipment, in-channel sediment removal in the structure vicinity, and cleaning the trash rack. Work needed for the radial gates includes inspection of gates and seals and periodic replacement of seals. Work needed for the trash rack includes periodic repair or replacement of components, inspecting for operation, and greasing and inspecting the motors.

Fish screen maintenance will be needed to ensure that screens are functioning to NMFS standards and capable of diverting the required flow. Fish screen maintenance includes removing the screens for cleaning, replacing screens when needed, periodic repair or replacement of brush cleaning system components, periodic repair or replacement of trash rack components, inspection for operation, greasing and inspecting motors, and in-channel sediment removal in the structure vicinity.

Fish passage facility maintenance is needed to ensure that the passage facility is functioning to NMFS standards. Depending on the type of fish passage facility built, fish passage facility maintenance may include removing sediment and debris from the facility, in-channel sediment removal in the structure vicinity, inspection of gates and seals and periodic replacement of seals, periodic repair or replacement of weir gates, periodic repair or replacement of supplementary water system components, inspection for operation, greasing and inspecting motors, and replacement of riprap, grouting, boulders, large woody debris, or other “natural” features of the fish passage facility.

Seepage control measure maintenance is dependent on the type of measures implemented but may include periodic sediment removal and channel re-shaping for interceptor ditches, cleaning or flushing of interceptor drains, repair and replacement of pump parts for seepage wells and lift pumps, and vegetation management, berm restoration, and rodent control for seepage berms. If 15-foot-deep slurry walls are constructed at all setback levees, similar to what is expected in the Compact Bypass area, maintenance efforts associated with the seepage control measure is expected to be minimal.

Levee and structure protection maintenance includes repair of protection measures due to erosion or degradation and vegetation management.

Water diversion canal maintenance includes sediment removal and channel re-shaping.

Maintenance Schedule

All maintenance activities, when possible, will be timed to minimize the impacts to fish. Access and safety concerns, as well as timing of flows, may affect timing of the maintenance activities, but can be scheduled around fish migration.

Maintenance of levees and floodplains with aquatic-safe herbicide treatment will occur sometime between spring and fall and will depend on the plant species that are being treated. Typically the herbicide will be administered prior to the plant going to seed and may need to be sprayed more than once. Disking for vegetation management usually occurs twice within the year; once in early spring after the wet season and then again in late summer prior to plants going to seed. Access road and levee restoration work will be done in the summer. Rodent control will be done by a pest control advisor and will be done in the spring through fall and not during the wet season.

Timing of the maintenance of structures within the waterways will depend on the flow hydrograph and forecasted flows, but can be expected in the summer/fall after high spring flows have receded. Cleaning of the in-channel structures will occur when flows are low enough to allow crews and equipment to enter the river safely to access the structures. San Mateo Avenue may be cleared earlier for access as soon as flows recede and are not likely to increase for the remainder of the water year. If earlier, this work will only be for road access and will not be located in the channel itself.

Debris that collects on trash racks, screens, ladders, or other fish passage structures will be periodically removed but will be scheduled based on the operation permits for these structures. Annual maintenance cleaning will be after the fish migration, but will be timed when flows have receded.

Lubing and annual gate maintenance will be in the late summer or early fall prior to winter and spring flows to be sure the structures are operating properly and to provide time for repairs and ordering parts if needed.

Operations

There are no operations for levees, floodplains, or levee and structure protection, for details refer to the proposed project BA (SJRRP 2016).

Monitoring Activities

Monitoring activities will include physical and nonphysical activities within the Action Area, for details refer to the proposed project BA (SJRRP 2016).

Construction of the Reach 2B Channel Improvements

Structures

Fish Passage Facility Control Structure at the Chowchilla Bifurcation Structure

The size and geometry of the fish passage facility would be dictated by the flow requirements for juvenile and adult fish.

San Joaquin River Control Structure at the Chowchilla Bifurcation Structure Modifications

The San Joaquin River control structure at the Chowchilla Bifurcation Structure will be modified to improve fish passage through the control structure itself or to improve operations of the passage facility.

San Mateo Avenue Crossing Removal

The San Mateo Avenue crossing is an existing river crossing located within a public right-of-way in Madera County and on private land in Fresno County at approximately RM 211.8. The crossing transitions from public right-of-way to private land at the center of the river. The crossing consists of a low flow or dip crossing with a single culvert. As part of the proposed project, the culvert and road embankments will be demolished, and no river crossing will be provided at this location.

Fish Habitat and Passage

The floodplain will provide riparian and floodplain habitat and support the migration and seasonal rearing of salmonids and other native fishes in Reach 2B. The floodplain has an average width of 4,200 feet and an inundated area of about 1,000 acres at 2,500 cfs.

The floodplain will result in about 440 acres of shallow water habitat for primary production as well as 560 acres of habitat that supports direct rearing at 2,500 cfs. Approximately 44 percent of the floodplain will inundate less than 1 foot deep at 2,500 cfs. The proposed project will retain about 650 acres of shallow water habitat at flows of 4,500 cfs. Inundation acreages may change during the design process.

Borrow

Borrow material will primarily be required for the construction of the levees, but it may also be used for foundation or backfill material in the construction of other structures. Topsoil from local borrow areas would be stockpiled for reuse at the borrow site or within the Action Area.

The locations of borrow areas are dependent on the locations of suitable materials. To the extent that suitable materials and the locations for floodplain grading coincide, borrow from those areas is preferred. Borrow from within the proposed project levees will be designed to be compatible with native fish habitat and uses by either reconnecting to the river channel or by restoring to an appropriate elevation to prevent excessive stranding.

Up to 350 acres of land will be needed for borrow areas, including borrow locations inside and outside the proposed project levees. Borrow areas will avoid sensitive biological resources and will also avoid permanent crops outside of the proposed project levees.

For further information on the proposed project description refer to the *Mendota Pool Bypass and Reach 2B Improvements Project Biological Assessment* (SJRRP 2016).

Proposed Conservation Measures

The following proposed conservation measures are based on the San Joaquin River Restoration Program's Conservation Strategy, developed with the Service, NMFS, and CDFW, proposed and agreed to by Reclamation in the *Formal Consultation and Conference Report Under Section 7(a)(2) of the Endangered Species Act for the San Joaquin River Restoration Program* (USFWS 2012) and will be implemented in a manner that is consistent with adopted conservation plans for sensitive species, and for wetland and riparian ecosystems of the Restoration Area. Those measures address all potentially affected federally-listed and/or State-listed species, and all other species identified by the Service, NMFS or CDFW as candidates, sensitive, or special-status in local or regional plans, policies, or regulations. The applicable, feasible measures will guide development of action-specific conservation strategies.

Giant garter snake

1. For work that will occur during the active season for giant garter snakes (between May 1 and October 1), preconstruction surveys will be completed by a qualified biologist approved by the Service and CDFW within a 24-hour period before any ground disturbance of potential giant garter snake habitat. If ground-disturbing activities stop on the project site for a period of 2 weeks or more, a new giant garter snake survey will be completed no more than 24 hours before the restart of ground-disturbing activities. Avoidance of suitable giant garter snake habitat, as defined by the Service (USFWS 1999) and CDFW will occur, where feasible, by demarcating and maintaining a 300-foot-wide buffer around these areas.
2. To the extent feasible, all activity involving disturbance of potential giant garter snake habitat will be restricted to the active season for giant garter snakes (between May 1 and October 1). For project activities that cannot feasibly occur within this window, a cofferdam will be constructed in coordination with the Service and work will be conducted in the dried area. If cofferdam construction is infeasible, work will be conducted during one active season (May 1 to October 1) and the following inactive season. Exclusion fencing and increased monitoring of wintering sites will occur in coordination with the Service during this inactive period construction. Construction will be minimized within 200 feet of banks of habitat, especially during the inactive period (Oct 2 to April 30) and movement of heavy equipment will be confined to existing roadways, to the extent feasible. Stockpiles and staging areas will be established more than 200 feet from the bank/edge of aquatic habitat.
3. Clearing will be confined to the contractor use area which should be considered the minimal area necessary to facilitate construction activities. Giant garter snake habitat within or adjacent to the proposed project will be flagged, staked, or fenced and designated as an Environmentally Sensitive Area. No activity will occur within this area, to the extent feasible, and Service-approved worker awareness training and biological monitoring will be conducted to ensure that avoidance measures are being implemented.

4. Vegetation will be hand-cleared in areas where suitable giant garter snake habitat is documented to occur, based on mapping provided in the BA or future, Service-approved mapping. Exclusionary fencing with one-way exit funnels will be installed at least 1 month before activities to allow the species to passively leave the area and to prevent reentry into work zones, per Service and/or CDFW guidance.
5. If a giant garter snake is found during construction activities, the Service, CDFW, and the proposed project's biological monitor will immediately be notified. The biological monitor, or his/her assignee, will stop construction in the vicinity of the find and allow the snake to leave on its own. The monitor will remain in the area for the remainder of the work day to ensure the snake is not harmed. Escape routes for giant garter snake should be determined in advance of construction. If a giant garter snake does not leave on its own within 1 working day, the Service and CDFW will be consulted.
6. All construction-related excavations will be covered to prevent entrapment of individuals. Where applicable, construction areas will be dewatered 2 weeks before the start of activities to allow giant garter snakes and their prey to move out of the area before any disturbance.
7. Any plugging or collapsing of small mammal borrows on levee structures within 200 feet of giant garter snake aquatic habitat will be done during the active season (between May 1 and October 1). Prior to the action, the burrow entrance will be either fitted with a one-way door mechanism that would allow snakes to exit the burrow, but not re-enter, or the burrow would be thoroughly examined using an appropriate scoping system that could reach the fullest extent of the burrow. This conservation measure will be included in all future levee maintenance actions.
8. Temporarily affected giant garter snake aquatic habitat will be restored in accordance with criteria listed in the Service Mitigation Criteria for Restoration and/or Replacement of Giant Garter Snake Habitat (Appendix A to *Programmatic Formal Consultation for USACE 404 Permitted Projects with Relatively Small Effects on the Giant Garter Snake Within Butte, Colusa, Glenn, Fresno, Merced, Sacramento, San Joaquin, Solano, Stanislaus, Sutter, and Yolo Counties, California* [USFWS 1997]), or the most current criteria from the Service or CDFW.
9. Permanent loss of giant garter snake habitat will be compensated at a ratio and in a manner consulted on with the Service and CDFW and may include dedication of conservation easements, purchase of credits at a Service-approved mitigation bank in sufficient quantity to compensate for the effect and/or other off-site conservation measures.
10. Protocol-level trapping surveys and detailed habitat mapping will be conducted in suitable habitat for giant garter snake in 2016. These surveys will be conducted by a biologist permitted by both the Service and CDFW, and in accordance with survey protocols approved by both agencies.

11. If giant garter snake is detected during the 2016 trapping surveys, a pre-construction trapping survey will be conducted within the appropriate work areas and giant garter snakes will be relocated to a nearby, safe location outside of harm’s way (likely either within Fresno Slough or Mendota Pool) prior to construction, in consultation with the Service and coordination with CDFW (note that only appropriately permitted individuals may handle listed species). If simply moving the snakes outside of the immediate area of disturbance is not feasible, then a relocation plan will be developed for longer-distance relocations (e.g., Volta Wildlife Area). The relocation plan will include information such as relocation methods, disease control methods, a habitat and giant garter snake population assessment at the recipient site, and post relocation monitoring methods.
12. On-site and off-site compensatory mitigation will occur in both Fresno Slough and the Volta Wildlife Area, to provide benefits to both populations.
13. Compensatory mitigation will occur in all feasible locations of those identified below, up to a 3.5:1 replacement ratio for impacted acres identified as suitable habitat (Table 1).

Table 1. Giant Garter Snake – Extent of Potential Impacts and Estimated Mitigation Acreages

Anticipated GGS Impacts	Potential Impacts (acres)	Mitigation Target (acres)
Aquatic	142	423
Upland	221	848
TOTAL	363	1,271 ¹

¹ = Amount may vary based on habitat availability and mitigation opportunities

14. Compensatory mitigation will include:
 - a. A new turn-key mitigation site, or sites, in Fresno Slough and/or
 - b. A new turn-key mitigation site or purchase of credits at a mitigation bank near the Volta Wildlife Area.
15. In addition to the above up to 3.5:1 acreage compensation, providing funding to assist the Volta Wildlife Area in developing additional water sources for giant garter snake habitat enhancement, constructing ridges for burrows in an existing area of habitat, or creating additional wetland habitat at the existing Volta Wildlife Area may be pursued to provide benefits to the existing population.

Least Bell’s Vireo

1. Prior to ground disturbance, a qualified biologist will conduct surveys for least Bell’s vireo in all riparian habitats within 500 feet of ground-disturbing activities at the start of the spring nesting season adhering to guidance offered in Least Bell’s Vireo Survey Guidelines (USFWS 2001).

2. If full protocol surveys cannot be implemented prior to initiation of ground-disturbing activities, the Service-approved monitoring biologist will be present for all activities within 500 feet of potentially suitable habitat. The monitoring biologist will perform a minimum of three focused surveys on three separate days prior to ground disturbance to determine the presence of least Bell's vireo, nest building, egg incubation, or brood rearing activities within 500 feet of the proposed project footprint. The surveys will begin a maximum of 7 days prior to construction and one survey will be conducted the day before ground disturbance. If any least Bell's vireo are detected, Reclamation will postpone work within 500 feet of the location and contact the Service within 24 hours. Upon notification, the Service will discuss the best approach to avoid/minimize impacts to nesting least Bell's vireo and a nest monitoring program acceptable to the Service. Subsequent to these discussions, work may be initiated subject to implementation of the agreed upon avoidance/minimization approach and nest monitoring program. In addition, if least Bell's vireo are detected within the Action Area Reclamation will stop all construction activities that will have the potential to impact the species and reinitiate consultation with the Service, and RNB-2 (Compensate for Loss of Habitat or Species) from the *Formal Consultation and Conference Report Under Section 7(a)(2) of the Endangered Species Act for the San Joaquin River Restoration Program* (08ESMF00-2012-F-0125) will be implemented.

Blunt-nosed leopard lizard

1. Within 1 year before the commencement of ground-disturbing activities protocol-level surveys will be conducted according to the *Blunt-Nosed Leopard Lizard Survey Protocols for the San Joaquin River Restoration Program* (USFWS 2009) on lands identified as potentially suitable for blunt-nosed leopard lizard, which consist of annual grassland and elderberry savannah habitats on the south side of the San Joaquin River near the Chowchilla Bifurcation Structure. If blunt-nosed leopard lizards are not detected within the Action Area, additional avoidance, minimization, and compensation for this species will not be required.
2. If blunt-nosed leopard lizard are detected within or adjacent to the Action Area, additional avoidance and minimization measures, including measures that will avoid direct take of this species, will be developed in coordination with Service and CDFW and implemented before ground-disturbing. Construction activities within blunt-nosed leopard lizard habitat will occur outside of the blunt-nosed leopard lizard peak activity period (April to July). In addition, if blunt-nosed leopard lizard are detected within or adjacent to the Action Area, Reclamation will stop all construction activities that will have the potential to impact the species and reinitiate consultation with the Service, and BNLL-2 (Compensate for Loss of Habitat or Species) from the *Formal Consultation and Conference Report Under Section 7(a)(2) of the Endangered Species Act for the San Joaquin River Restoration Program* (08ESMF00-2012-F-0125) will be implemented.

Fresno Kangaroo Rat

1. Preconstruction surveys will be conducted by a Service-approved biologist to determine if potential burrows for Fresno kangaroo rat are present in the proposed project footprint in annual grassland and elderberry savannah identified as potential Fresno kangaroo rat habitat on the south side of the San Joaquin River near the Chowchilla Bifurcation Structure. Surveys will be conducted well in advance of ground-disturbing activities. The biologist will conduct burrow searches by systematically walking transects, which will be adjusted based on vegetation height and topography, and in coordination with the Service and CDFW. Transects will be used to identify the presence of kangaroo rat burrows. When burrows are found within 100 feet of the proposed project footprint, focused live trapping surveys will be conducted by a biologist permitted to handle Fresno kangaroo rat by both the Service and CDFW, and following a Service and CDFW approved trapping plan.
2. If Fresno kangaroo rat are detected within or adjacent to the Action Area, additional avoidance and minimization measures will be developed in coordination with the Service and CDFW, as appropriate, and construction activities will be conducted when they are least likely to affect the species (i.e., after the normal breeding season of December through September [Ahlborn 1999]). This timing will be coordinated with the Service and CDFW. In addition, if Fresno kangaroo rat are detected within or adjacent to the Action Area, Reclamation will stop all construction activities that will have the potential to impact the species and reinitiate consultation with the Service, and FKR-3 (Compensate for Loss of Habitat or Species) from the *Formal Consultation and Conference Report Under Section 7(a)(2) of the Endangered Species Act for the San Joaquin River Restoration Program* (08ESMF00-2012-F-0125) will be implemented.

San Joaquin kit fox

1. A qualified biologist will conduct preconstruction surveys in the Action Area no less than 14 days and no more than 30 days before the commencement of ground-disturbing activities to identify potential dens more than 5 inches in diameter. Reclamation will implement the Service's *Standardized Recommendations for Protection of San Joaquin Kit Fox Prior to or During Ground Disturbance* (USFWS 2011). Reclamation will notify the Service and CDFW in writing of the results of the preconstruction survey within 30 days after these activities are completed.
2. If San Joaquin kit fox are detected within the Action Area, additional avoidance and minimization measures, including measures that will avoid direct take of this species, will be developed in coordination with the Service and CDFW and implemented before initiation of ground-disturbing activities. If dens are located within the proposed work area, and cannot be avoided during construction activities, a Service-approved biologist will determine if the dens are occupied. Reclamation will present the results of pre-activity den searches within 5 days after these activities are completed and before the start of ground-disturbing activities in the Action Area. Reclamation will notify the Service and CDFW immediately if a natal or pupping den is found in the survey area.

3. If occupied San Joaquin kit fox dens are present within the proposed work area, their disturbance and destruction will be avoided, to the fullest extent possible. Exclusion zones will be implemented following the latest Service procedures, and construction activities in occupied San Joaquin kit fox habitat will be conducted when they are least likely to affect the species (i.e., after the normal breeding season of December to April [Ahlborn 2000]). This timing will be coordinated with the Service and CDFW. In addition, if San Joaquin kit fox are detected within or adjacent to the Action Area, Reclamation will stop all construction activities that will have the potential to impact the species and reinitiate consultation with the Service, and SJKF-2 (Compensate for Loss of Habitat or Species) from the *Formal Consultation and Conference Report Under Section 7(a)(2) of the Endangered Species Act for the San Joaquin River Restoration Program* (08ESMF00-2012-F-0125) will be implemented.

Federally Listed Plants

1. Within 1 year before the commencement of ground-disturbing activities, protocol-level surveys for the special-status plants that are applicable to Reach 2B, will be conducted in grassland, elderberry savannah, fresh emergent wetland, and wet herbaceous habitats by a qualified botanist, in accordance with *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities* (CDFW 2009). If detected, locations of special-status plant populations that can be avoided will be clearly identified in the field by staking, flagging, or fencing a minimum 100-foot-wide buffer around them before the commencement of ground-disturbing activities. No activity will occur within the buffer area, and worker awareness training and biological monitoring will be conducted to ensure that avoidance measures are being implemented.
2. If federally listed plants are detected within or adjacent to the Action Area, additional avoidance and minimization measures, including measures that will avoid direct take of this species, will be developed in coordination with the Service and CDFW. In addition, if federally listed plants are detected within or adjacent to the Action Area and complete avoidance is not possible, Reclamation will stop all construction activities that will have the potential to impact the species and reinitiate consultation with the Service, and PLANTS-2 (Compensate for Loss of Special-Status Plants) from the *Formal Consultation and Conference Report Under Section 7(a)(2) of the Endangered Species Act for the San Joaquin River Restoration Program* (08ESMF00-2012-F-0125) will be implemented.

Action Area

The Action Area includes all areas that may be directly or indirectly affected by the proposed project activities. This includes the proposed project footprint, including Reach 2B, a section of the San Joaquin River which begins at the Chowchilla Bifurcation Structure and the bypass channel 0.6 miles downstream of Mendota Dam. The Action Area extends beyond the proposed project footprint to areas where project-related activities may cause high levels of noise, dust, vibrations, or other disturbances. This includes any areas where equipment, personnel, or any

other project-associated elements may cause disturbances to wildlife; such as road improvements needed to access the proposed project footprint, and any other areas required for operating, storing, and refueling construction equipment.

Analytical Framework for the Jeopardy and Adverse Modification Determinations

Jeopardy Determination

In accordance with policy and regulation, the jeopardy analysis in this biological opinion relies on four components: (1) the *Status of the Species*, which evaluates the giant garter snake's range-wide condition, the factors responsible for that condition, and its survival and recovery needs; (2) the *Environmental Baseline*, evaluates the condition of this listed species in the action area, the factors responsible for that condition, and the relationship of the action area to the survival and recovery of this species; (3) the *Effects of the Action*, which determines the direct and indirect effects of the proposed Federal action and the effects of any interrelated or interdependent activities on these species; and (4) *Cumulative Effects*, which evaluates the effects of future, non-Federal activities in the action area on the giant garter snake.

In accordance with policy and regulation, the jeopardy determination is made by evaluating the effects of the proposed Federal action in the context of the species' current status, taking into account any cumulative effects, to determine if implementation of the proposed action is likely to cause an appreciable reduction in the likelihood of both the survival and recovery of the species in the wild.

The jeopardy analysis in this biological opinion places an emphasis on consideration of the range-wide survival and recovery needs of the giant garter snake and the role of the action area in the survival and recovery of the species as the context for evaluating the significance of the effects of the proposed Federal action, taken together with cumulative effects, for purposes of making the jeopardy determination.

Adverse Modification Determination

No federally designated critical habitat for any listed species is within the proposed project Action Area.

Status of the Species

Giant Garter Snake

See the Service's Revised Draft Recovery Plan for the Giant Garter Snake (*Thamnophis gigas*) (USFWS 2015).

Least Bell's Vireo

See the Service's most recent 5-year Review (USFWS 2006).

Fresno Kangaroo Rat

See the Service's most recent 5-year Review (USFWS 2010).

Environmental Baseline

Giant Garter Snake

The giant garter snake is known to occur in suitable habitat in the San Luis National Wildlife Refuge Complex, in the Mendota Wildlife Area, at Mendota Pool (Dickert 2005), and south of the San Joaquin River in Fresno Slough (USFWS 2007). Although no sightings of giant garter snakes south of the Mendota Wildlife Area have occurred since the time of listing (Hansen 2008), the species is expected to occur in suitable habitat at other locations in the Restoration Area and, although it generally avoids large, wide rivers, giant garter snakes may occur in portions of the river channel that would be inundated by the release of Interim and Restoration flows. This species also may occur in suitable habitat in other locations in the Action Area that cannot be assessed because of private property constraints.

Least Bell's Vireo

The San Joaquin Valley is within the historic range of least Bell's vireo. Until 2005, breeding in the San Joaquin Valley had not been observed for over 50 years. In 2005, Howell and others (2010) detected a Least Bell's vireo nest in riparian habitat on the San Joaquin River National Wildlife Refuge (SJRNWR). Several similar nesting attempts have since been documented in the vicinity of the SJRNWR through 2007 (Howell et al. 2010). The SJRNWR is approximately 75 miles northwest of the Action Area and is characterized by large uninterrupted tracts of complex, mature riparian forest. These sightings represent the nearest documentation of the species in the Central Valley outside the established populations in southern California.

The least Bell's vireo nests in dense, low, shrubby vegetation, generally in riparian areas but also brushy fields, young second-growth forest or woodland, scrub oak, coastal chaparral, and mesquite brushlands, where it may build nests as low as 1 foot above the ground. This species may occur in suitable habitat in the Action Area, including along portions of the San Joaquin River.

Fresno Kangaroo Rat

The Fresno kangaroo rat is a small burrowing mammal that has been reported in the vicinity of the Restoration Area, having been observed at the Alkali Sink Ecological Reserve and Mendota Wildlife Area. This species is considered by some to be extirpated along the San Joaquin River because of repeated negative findings during survey efforts since 1993 (CDFW 2005). This species inhabits grassland and scrub habitats but does not occupy riparian areas, although it may disperse through dry river washes. Suitable upland habitats may be located adjacent to the Action Area. Critical habitat has been designated for Fresno kangaroo rat, adjacent to the Restoration Area, approximately 4 miles from the Restoration Area in Reaches 2A and 2B.

The last verified capture, a single male, occurred in 1992 on the Alkali Sink Ecological Reserve (USFWS 2010), an area approximately 2 miles south of the Action Area. This 565-acre Ecological Reserve is within the 857 acres of Designated Critical Habitat for the species. According to an unpublished CDFW report, since 1992 CDFW grid surveys and independent

research efforts, including reconnaissance trapping of active burrows conducted systematically over large portions of the reserve at some of the locations where Fresno kangaroo rats are most likely to persist, have failed to detect this species (Entrix 2008). The lack of connectivity from this Ecological Reserve to what remains of suitable habitat prevents dispersal and increases environmental and genetic pressures in any existing population (USFWS 2010).

Effects of the Action

Construction activities in the Compact Bypass and Reach 2B channel improvements portion of the proposed project will result in the potential permanent loss of 221 acres of suitable upland and 142 acres of aquatic habitat for giant garter snake (363 total). Project construction activities have the potential to harm, harass, or kill giant garter snake through the degradation of habitat quality, and production of high levels of noise, vibration, and other disturbances during construction including potential harm and mortality by construction activities and equipment use. Conservation Measures will be implemented to avoid and minimize effects and the risk of take associated with construction activities. Reclamation has proposed the acquisition of compensatory mitigation at 3.5:1 replacement ratio for impacted acres identified as suitable habitat, targeting for 423 acres of aquatic habitat and 848 acres of upland habitat to be acquired prior to the completion of the proposed project.

The implementation of proposed conservation measures that include protocol surveys, may adversely affect the least Bell's vireo and the Fresno kangaroo rat. If least Bell's vireo are nesting within the Action Area then their behavior will be impacted by the use of call play backs used during survey efforts and nest site verification. The impacts from the use of call play backs and nest site verification will be minimized by following the Service's survey protocols.

Fresno kangaroo rats may be adversely affected as a result of protocol trapping efforts to verify presence of the species if small mammal burrows are found within the Action Area indicating potential presence of the species. The impacts to Fresno kangaroo rats will be minimized by following the Service's survey and trapping protocols.

Cumulative Effects

Cumulative effects include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

Continued human population growth in the Central Valley, in general, and the San Joaquin Valley area, in particular, is expected to drive further development of agriculture, cities and industry, transportation, and water resources in the foreseeable future. Some of these future activities will not be subject to Federal jurisdiction (and thus are considered to enter into cumulative effects), and are likely to result in loss of aquatic and associated upland habitats where the giant garter snake may occur.

It is likely that future actions in the region will not require section 7 consultation with the Service for compliance with the Act and will not obtain take coverage pursuant to section 10 of the Act. There will be no mechanism to provide “take” coverage for projects without a Federal nexus besides these projects pursuing their own individual Habitat Conservation Plans. Some “take” of listed species is likely to occur for which no minimization, avoidance, and compensation/mitigation measures for federally-listed species are implemented.

Conclusion

After reviewing the current status of the giant garter snake, least Bell’s vireo, and Fresno kangaroo rat, the environmental baseline for the action area, the effects of the proposed project and the cumulative effects, it is the Service’s biological opinion that the proposed project is not likely to jeopardize the continued existence of these federally-listed species. The Service reached this conclusion because the project-related direct and indirect effects to these species will not rise to the level of precluding recovery of the species or reducing the likelihood of survival of the species. Full implementation of the conservation measures that have been proposed by Reclamation will address the anticipated impacts to these species, and the habitat loss for the giant garter snake.

INCIDENTAL TAKE STATEMENT

Section 9(a)(1) of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened fish and wildlife species without special exemption. Take is defined as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harass is defined by the Service as an intentional or negligent act or omission which creates the likelihood of injury to a listed species by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering. Harm is defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by impairing behavioral patterns including breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with this Incidental Take Statement.

The measures described below are non-discretionary, and must be implemented by Reclamation so that they become binding conditions of any action associated with the proposed project, as appropriate, in order for the exemption in section 7(o)(2) to apply. Reclamation has a continuing duty to regulate the activity covered by this incidental take statement. If Reclamation (1) fails to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, and/or (2) fails to retain oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, Reclamation must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement [50 CFR §402.14(i)(3)].

Amount or Extent of Take

The Service anticipates that no take in the form of harm or mortality will occur as a result of the proposed project to least Bell's vireo and Fresno kangaroo rat. Take in the form of handling, harassment, and breeding behavior disruption may occur as the result of the protocol surveys and associated trapping efforts that are proposed as part of the conservation measures for the proposed project.

The Service anticipates incidental take of giant garter snake will be difficult to detect or quantify. The cryptic nature of the species and its highly aquatic nature make the finding of an injured or dead specimen unlikely. The species occurs in habitats that make it difficult to detect. Due to the difficulty in quantifying the number of giant garter snakes that will be taken as a result of the proposed project, the Service is quantifying take incidental to the project as death, injury, harassment, and harm of all giant garter snakes inhabiting or otherwise utilizing 142.3 acres of aquatic habitat and 220.7 acres of upland habitat. Upon implementation of the following Reasonable and Prudent Measures, incidental take of giant garter snakes associated with the proposed project will become exempt from the prohibitions described under section 9 of the Act.

Effect of the Take

The Service has determined that this level of anticipated take is not likely to result in jeopardy to the giant garter snake, least Bell's vireo, and Fresno kangaroo rat.

Reasonable and Prudent Measures

The Service believes the following reasonable and prudent measures are necessary and appropriate to minimize the impact of taking giant garter snakes:

1. Minimize take in the form of harassment and/or harm of the giant garter snake during project construction activities and during project implementation.
2. The permanent loss and degradation of giant garter snake habitat shall be confined to the proposed project site, and minimized and restored to the greatest extent practicable.

Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the Act, Reclamation must ensure compliance with the following terms and conditions, which implement the reasonable and prudent measures described above. These terms and conditions are non-discretionary:

1. Reclamation personnel, and all agents and contractors representing Reclamation, will implement all the described conservation measures included in this biological opinion.

2. In order to monitor whether the amount or extent of incidental take anticipated from implementation of the project is approached or exceeded, Reclamation shall adhere to the following reporting requirements. Should this anticipated amount or extent of incidental take be exceeded, Reclamation must immediately reinitiate formal consultation as per 50 CFR 402.16.
 - a. For those components of the action that may result in direct encounters between listed species and project workers and their equipment whereby incidental take in the form of harassment, harm, injury, or death is anticipated, Reclamation shall immediately contact the Service's San Francisco Bay-Delta Fish and Wildlife Office (BDFWO) at (916) 930-3800 to report the encounter. If encounter occurs after normal working hours, Reclamation shall contact the BDFWO at the earliest possible opportunity the next working day.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purpose of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities that can be implemented to further the purposes of the Act, such as preservation of endangered species habitat, implementation of recovery actions, or development of information and databases.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

We propose the following conservation recommendations to Reclamation:

1. Assist the Service in implementing recovery actions identified within the Recovery Plans for federally listed species, and their critical habitat areas.
2. Encourage or require the use of appropriate California native species in revegetation and habitat enhancement efforts associated with projects authorized or undertaken by Reclamation.
3. Sightings of any listed or sensitive animal species should be reported to the California Natural Diversity Database of the CDFW. A copy of the reporting form and a topographic map or adequate aerial photograph clearly marked with the location the animals were observed also should be provided to the Service.

REINITIATION NOTICE

This concludes formal consultation on the proposed project. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if; (1) the amount or extent of incidental take is exceeded, (2) new information reveals effects of the proposed action may affect listed species or critical habitat in a manner or to an extent not considered in this opinion, (3) the agency action is subsequently modified in a manner that causes an effect to listed species or critical habitat that was not considered in this opinion, or (4) a new species is listed or critical habitat is designated that may be affected by the proposed action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

Any questions or comments regarding these comments should be directed to Rocky Montgomery, Senior Biologist, San Joaquin River Restoration Program/Watershed Planning Branch at (916) 414-6733.

cc:

Ms. Kathy Norton, US Army Corps of Engineers, Sacramento, California
Ms. Maria Rea, National Marine Fisheries Service, Sacramento, California
Mr. Gerald Hatler, California Department of Fish and Wildlife, Fresno, California
Mr. Kevin Faulkenberry, Department of Water Resources, South Central Region Office, Fresno, California

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