

Attachment F

U.S. Fish and Wildlife Service Final Coordination Act Report



United States Department of the Interior

FISH AND WILDLIFE SERVICE
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In reply refer to:
08FBDT00-2015-CP A-0002

Memorandum

To: Manager, Bureau of Reclamation, South-Central California Area Office,
Fresno, California (Attn: David Hyatt)

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

Subject: Final Fish and Wildlife Coordination Act Report for the U.S. Bureau of
Reclamation's North Valley Regional Recycled Water Program

In accordance with 48 Stat. 401, as amended; 16 U.S.C. 661 et seq., this document constitutes the U. S. Fish and Wildlife Service's (Service) Final Fish and Wildlife Coordination Act (FWCA) report to the U. S. Bureau of Reclamation (Reclamation) for the North Valley Regional Recycled Water Program (Project). The FWCA requires Federal agencies proposing water resource development projects or involved in issuance of related permits or licenses to consult with the Service and provide equal consideration to the conservation, rehabilitation, and enhancement of fish and wildlife resources with other project purposes. The findings of this final report are based on information provided in the North Valley Regional Recycled Water Program Draft Environmental Impact Report/Statement dated November 2014 and review of available scientific literature. This final report addresses the proposed Project-related beneficial and adverse effects on fish and wildlife resources and provides recommendations for Project implementation. Details of the project's effects on federally listed species, pursuant to section 7 of the Endangered Species Act of 1973, as amended, are being addressed separately.

Background

The United States Department of the Interior, Bureau of Reclamation (Reclamation) and the City of Modesto have jointly prepared a draft Environmental Impact Report/Environmental Impact Statement (EIR/EIS) for the North Valley Regional Recycled Water Program (NVRWP or Proposed Project).

The City of Modesto, City of Turlock, and Del Puerto Water District (DPWD) (Partner Agencies) propose to implement a regional solution to address water supply shortages in DPWD's service area on the west side of the San Joaquin River in San Joaquin, Stanislaus and Merced Counties, south of the Sacramento-San Joaquin River Delta (Delta). The project would

deliver up to 59,000 acre feet per year (AFY) of recycled water produced by the cities of Modesto and Turlock via the Delta-Mendota Canal (DMC), a feature of the Central Valley

Project owned by Reclamation. Instead of discharging into the San Joaquin River, recycled water would be conveyed from Modesto and Turlock through pipelines from their wastewater treatment facilities, crossing the San Joaquin River, ending at the DMC. The recycled water would then be conveyed directly to DPWD customers. This project also proposes to provide water to Central Valley Project Improvement Act (CVPIA) designated Refuges located south of the Delta to help them get closer to reaching their Full Level 4 goal each year.

The Project Partners have identified two alternatives that use different pipeline alignments to convey water to the DMC. In addition the draft EIR/EIS evaluates a third alternative, which would continue river discharge, and then divert and convey water to the DMC through expanded facilities owned by the Patterson Irrigation District.

The draft EIR/EIS assesses potential environmental effects of the NVRRWP alternatives and a No Action Alternative on resources including: aesthetics, air quality, agriculture, biological resources, cultural resources, energy, geology and soils, greenhouse gas emissions, hazards and hazardous materials, hydrology and water quality, land use and planning, noise, population and housing, public services and utilities, recreation, transportation, socioeconomics, and environmental justice.

Project Area

The Proposed Project is located within San Joaquin, Stanislaus and Merced Counties. Proposed Project facilities, consisting of pipelines, pump stations, and appurtenance improvements would generally be located about eight miles west of the cities of Modesto and Turlock, in Stanislaus County, though all work within the Jennings Wastewater Treatment Plant site would be within the jurisdictional boundaries of the City of Modesto. Water would be delivered to farms within DPWD's service area in San Joaquin, Stanislaus, and Merced Counties, as well as to south of Delta (SOD) refuges.

PROJECT DESCRIPTION

No Action Alternative

Under the No Action Alternative, no long-term, sustainable recycled water supply would be available to meet demands within the District or the refuges. The District would continue to rely on the CVP as its primary water supply. To offset reductions in CVP allocations, the District would continue to execute water transfers/exchanges and to pump groundwater from private wells.

Proposed Action

Del Puerto Water District, City of Modesto, and City of Turlock (collectively, the Partner Agencies) propose to provide a new source of water to agricultural lands on the west side of the San Joaquin River in San Joaquin, Stanislaus and Merced Counties, south of the Sacramento-San Joaquin River Delta (Delta), and to certain CVPIA-designated SOD refuges. Specifically, the Proposed Project/Action would introduce and convey, on a space available basis, up to 59,000

acre-feet per year (AFY) of recycled water produced by the cities of Modesto and Turlock directly into the DMC, which is owned by Reclamation. The recycled water would then be conveyed directly to DPWD customers or stored in Reclamation facilities during low water demand periods. In addition to uses within DPWD's service area, the Proposed Project would provide water to certain CVPIA SOD wildlife refuges and wetland areas to meet their need for supplemental water supply.

Three action alternatives were evaluated at an equal level of analysis, including two pipeline corridor alternatives that convey recycled water produced by the cities of Modesto and Turlock directly to the DMC and a third action alternative that would use the San Joaquin River and an expanded Patterson Irrigation District (PID) system for conveyance. Alternative I was selected as the preferred alternative and therefore is the only one discussed in this report.

Alternative 1: Combined Pipeline Alternative

The Combined Pipeline Alternative consists of two reaches totaling 69,800 linear feet (see Figure I). The south-north reach from the Harding Drain Bypass Pipeline would be 42 inches in diameter and would extend from the western end of the Harding Drain Bypass Pipeline near the existing standpipe structure on South Carpenter Road, then parallel South Carpenter Road north to West Main Street, then turn west to Jennings Road. From Jennings Road, the pipeline would extend west along existing dirt roads through agricultural fields owned by Modesto and terminate at the existing Jennings Plant outfall pump station near the southeastern end of the Jennings Plant. Combined flows from the pumping facility at the Jennings Plant, which would be modified to meet capacity needs, would then travel in a 54-inch pipeline, which would cross under the San Joaquin River and extend west to the DMC along Lemon Avenue, through farmland, and along Zacharias Road. Table -1 shows the two segments and characteristics of each pipeline segment.

The proposed pipeline would cross a total of five irrigation canals along the Lemon Avenue alignment, all of which are operated by the PID. Construction would take approximately 21 months, starting in fall 2016.

Figure 1: Combined Alignment Alternative (Alternative 1)

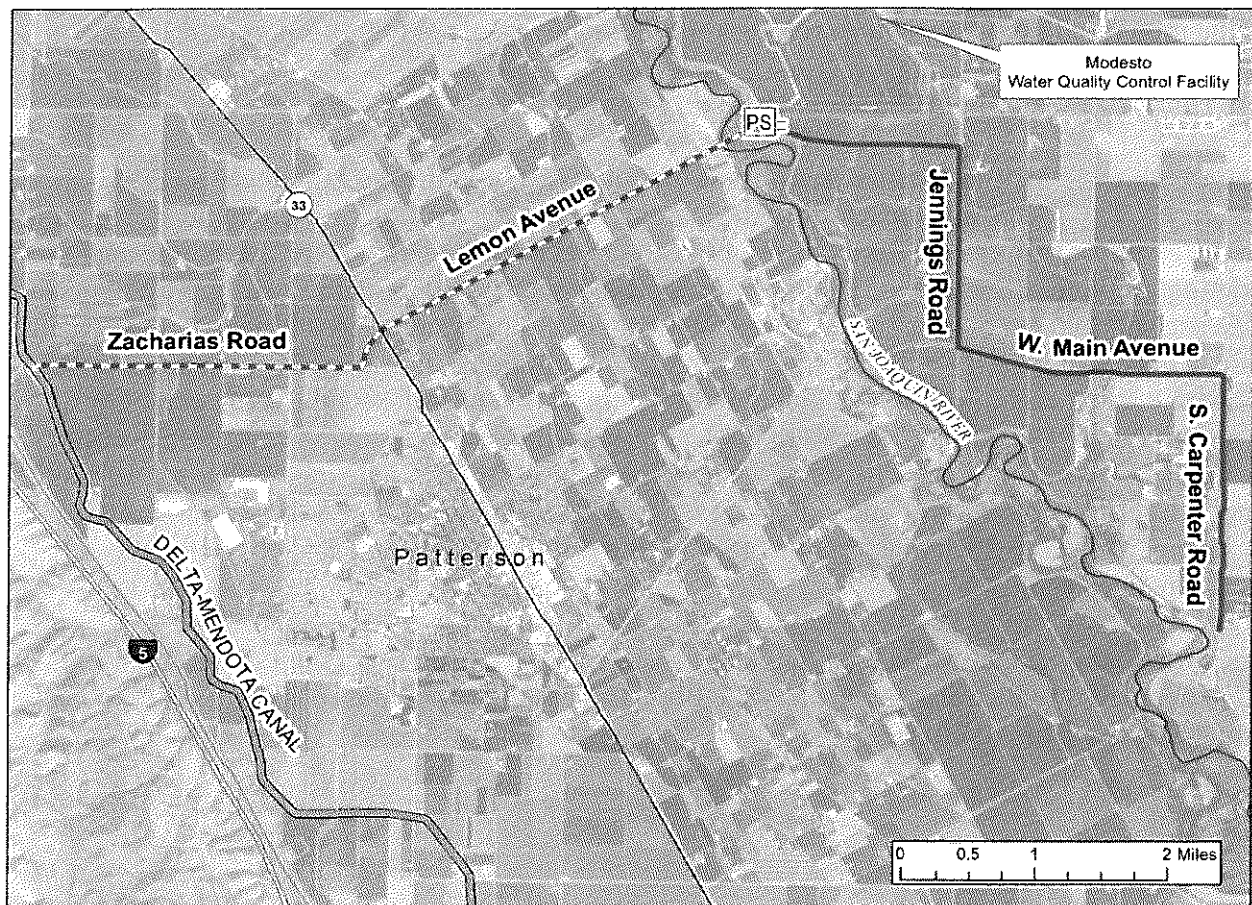


Table 1: Alternative 1 - Combined Pipeline Alternative Reach Characteristics

Segment	Approximate Length (feet)	Pipe size (inches)	Special Construction Considerations
Harding Drain Bypass to Jennings Plant Pump Station			
South Carpenter Road between Hardinn Drain and West Main	37,800	42	Potential for lane/road closure requiring detours and other traffic control. Potential lane/road closures along Jennings Road, West Main Avenue and South Carpenter Road. Crossing of West Main Avenue at South Carpenter Road may use trenchless technology.
West Main Avenue between South Carpenter and Jennings Road			
Jennings Road between West Main and agricultural field access road			
Agricultural field access road between Jennings Road and Jennings Plant Pump Station			
Jenninas Plant Pump Station to DMC			
Open Space (including San Joaquin River and floodplain) between Jennings Plant and Lemon Avenue	32,000	54	Trenchless installation techniques such as horizontal directional drilling (HOD) or tunneling of the pipeline would be required to cross under San Joaquin River to avoid the waterway and wetland resources.
Lemon Avenue between San Joaquin River and SR 33			Road closure anticipated along Lemon Avenue during construction, requiring detours. One segment of trenchless pipe would be required to cross both SR 33 and California Northern Railroad (CFNR). Trenchless method may be needed to cross irrigation canals.
Agricultural Fields from east side of SR 33 to west side of SR 33			
Zacharias Road from just west of SR 33 to DMC			
Total Length of two reaches	69,800		

Notes: The CFNR parallels SR 33 through much of the San Joaquin Valley, and spans the extent of the NVRWP project bounds. The center line of SR 33 is approximately 75 feet away from the center line of the CFNR. Due to the proximity of the highway to the CFNR, it is assumed that a single trenchless pipe would be sized to span both crossings. The CFNR would require a protective casing for the pipe crossing under the railroad tracks.

This alternative would require that the Cities of Modesto and Turlock obtain approval of a Wastewater Change Petition from the State Water Resources Control Board, Division of Water Rights pursuant to Section 1211 of the Water Code. Approval of the petition would establish a water right for the recycled water, and would enable a change in the point of discharge from the

San Joaquin River to the DMC. In reviewing and approving Petitions for Change, the Division of Water Rights must be able to find that the proposed change would not injure other legal users of water, would not unreasonably harm instream uses, and would not be contrary to the public interest. All petitioners must send a copy of the petition to the California Department of Fish and Wildlife. Additionally, if the proposed project has the potential to impair the water supply of other legal users of water or instream beneficial uses, the Division would require public notice of the petition. Protestants may raise concerns about protecting their water rights, or may raise public trust concerns. A protest sets forth the protestant's objections to approval of the petition. If the Division receives a protest, further review would be conducted to consider whether the reductions in flows at the existing discharge locations would adversely affect the environment or the rights of any downstream water users. The SWRCB would only issue an order approving the petition if the change in the discharge did not have adverse impacts on downstream habitat or legal users of water. Both Modesto and Turlock would maintain their existing discharge locations at the San Joaquin River, and would continue to maintain National Pollutant Discharge Elimination System (NPDES) permits for those discharges, but the project/action would reduce the amount of recycled water discharged to the San Joaquin River with the primary point of discharge being to the DMC. Modesto has received approval of their Petition for Change but Turlock's Petition is still under review.

Pump Station

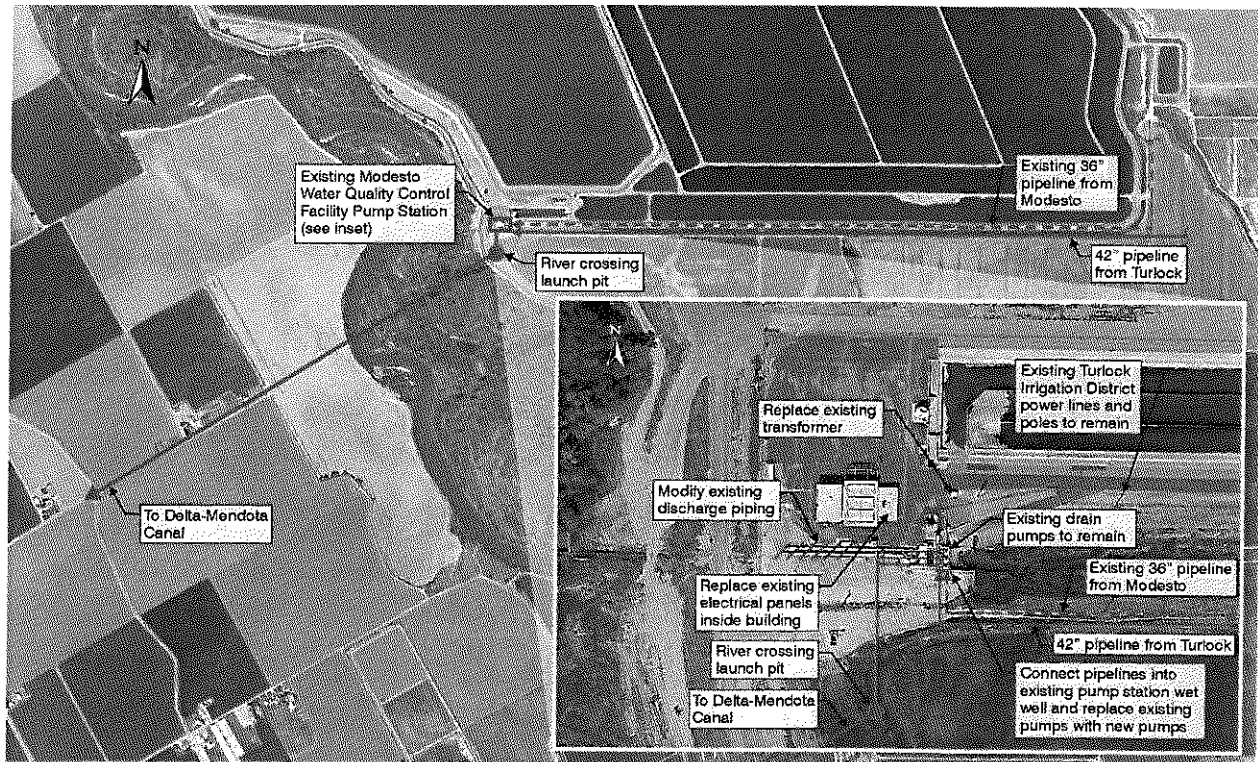
Only the modified existing Jennings Plant outfall pump station described below would be required as part of the proposed project to convey combined flow to the DMC. Flow from the Harding Drain Bypass Pipeline would be conveyed by gravity to the modified pump station at the Jennings Plant, where it would combine with flow from Modesto. Figure -2 shows the conceptual modifications to the existing pump station. Details for the pump station are shown in Table -2.

The pump station buildings would be surrounded by pavement for access and a fence to ensure security. Automatic-sensor lights would also be installed to provide safety and security. The existing Turlock Irrigation District (TID) power supply to the Jennings Plant pump station, consisting of above-grade wires mounted on poles is assumed to be used for the modified pump station. Alternative I is estimated to use 15,442 megawatt hours per year of electricity for pumping. Generators may be needed to provide emergency power in the event of a power outage.

Table 2: Pump Station Characteristics (Preliminary)

Alternative / Pump Station	Horsepower (hp)	Flow Rate (cfs)	Dimensions (length x width)	Maximum Height (feet)
Alternative 1				
Modified Jennings Plant Pump Station	500	46	Pumps would be installed in existing pump station structure; approximately 20 feet x 30 feet	Pumps located outdoors on top of existing wet well; approximately 15 feet high above ground level

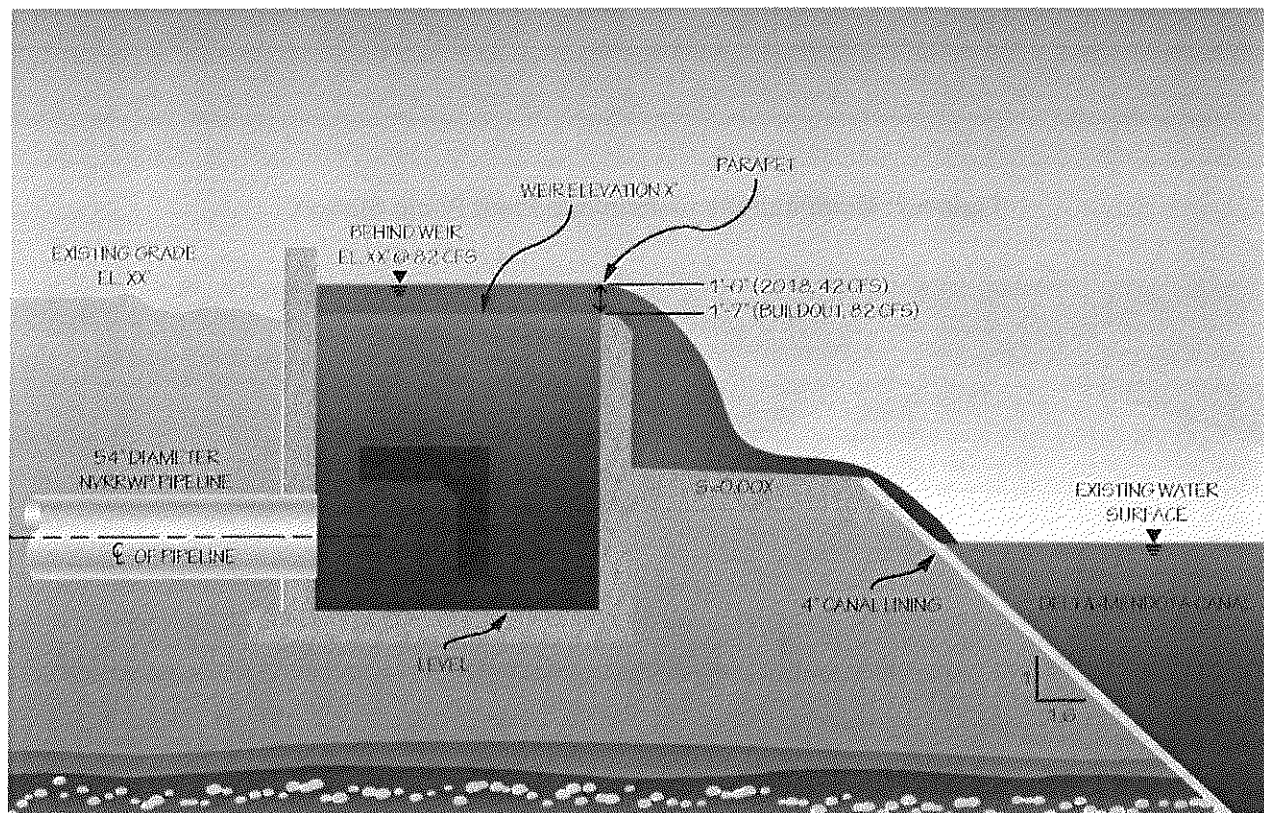
Figure 2: Modifications to Jennings Plant Pump Station



DMC Discharge Facility

Water would be discharged to the DMC at an outfall facility located adjacent to the east bank of the existing DMC. The footprint of the facility would be approximately 30 feet by 50 feet, and would be enclosed with security fencing. The structure itself would consist of a reinforced concrete, open-ended rectangular box, situated below and above grade (Figure 3). The box would contain a fixed-point, sharp-crested weir for hydraulic stability. Downstream of the weir, the water would flow over a concrete slab and into the DMC; this would not require the modification or alteration of the existing DMC concrete lining. The facility would also include metering in a concrete vault structure and telemetry devices for communicating flow and water quality data and remote monitoring of the discharge facility.

Figure 3: Discharge Facility Section View



Operations

Under this project, the SOD CVP system would be used as a conveyance and storage facility for recycled water, which is considered "non-project water" (i.e. non-CVP water). A long-term Wanen Act Contract would be needed with Reclamation to convey the water in the DMC and store the water in the SOD CVP system. Once water is in the DMC, water could be diverted from any point along the DMC through existing turnouts to the DPWD service area and south of the Delta refuges or to the San Luis Reservoir for storage during the low water demand periods

(e.g., certain winter/spring months). Because both Cities' treatment plants operate 24 hours per day and existing Reclamation-owned facilities could potentially be used for storage, the project could be operated year-round. Thus, the pump stations and pipelines could be operated 24 hours per day to deliver tertiary-treated water to the DMC. However, non-project water is conveyed in the DMC on a space available basis; availability of space is determined by Reclamation and is based on either the physical or "operational" availability of conveyance capacity in the DMC.

No changes to the District's internal, administrative water allocation system would occur. DPWD would work directly with Reclamation / San Luis and Delta-Mendota Water Authority (SLDMWA) to track water inputs and outputs into the DMC.

With respect to the SOD refuges, water would be delivered to them during low agricultural irrigation periods. Water would be supplied to the refuges using Reclamation-owned facilities, similar to current water deliveries to these same refuges. Water would be provided to the refuges via either existing turnouts from the DMC or through other existing private water districts' conveyance systems, as appropriate during the refuges' peak demand periods. No additional infrastructure would be required to serve water to refuges. Deliveries would vary by water year type, and would be made primarily during the winter-time "flood-up" months when the refuge water needs are the greatest. Up to 5,900 AFY of new supply could be provided to refuges for wildlife and habitat management.

Maintenance

Maintenance of the project would primarily involve regular inspections of the pipelines and pump stations. The pipeline would be inspected as needed in any given year, and the pump stations would be inspected monthly. Existing Turlock and Modesto operations and maintenance staff would conduct maintenance activities. No vehicular trips would be needed for inspection of the pump station at Modesto's Jennings Wastewater Treatment Plant because it is located on the treatment plant site, where existing staff currently maintain its facilities.

Construction Considerations

The precise construction methods are yet to be determined **but** work is anticipated to follow the broad methods outlined in the following sections.

All pipeline construction would occur within public roadways or other public right of way (ROW), private and municipal agricultural lands, and public open space areas (San Joaquin River and its floodplain). An easement from the California Department of Transportation (Caltrans) would be required to construct the pipeline underneath SR 33. An access agreement may be required for railroad crossings. Construction of the pipeline alignments would consist of open-cut construction, except at specific crossings (e.g., river, highway, railroad, and irrigation canals), where trenchless construction techniques would be employed.

Spoil (soil and rock) excavated during construction would be reused on site for backfilling or would be disposed of properly. Any material that would not be reused as backfill would be stabilized and stored temporarily at the construction staging area until characterized and then

hailed away to a permitted disposal site. Potential for reuse of spoil from a trenchless installation would depend on the trenchless method selected because some methods remove spoil using slurry (i.e. the material is mixed with water or drilling fluid) and for those methods it is not practical to reuse excavated spoil.

Construction Timing

Construction is tentatively scheduled to last approximately 1.5 years, from the summer of 2016 to spring 2018. Typical project work hours would be Monday through Friday from 7:00 AM to 7:00 PM, but construction might take place during weekends and nighttime if necessary. The project construction contractor would be responsible for obtaining the necessary permits to conduct weekend and nighttime activities.

Staging Areas

Equipment, material and vehicle staging would be accommodated either at the construction zones, or at selected off-site locations (e.g., open lots) owned by the Cities. Staging areas could include:

- the area around the proposed discharge structure at the DMC;
- the area around the existing Jennings Plant Pump Station; and
- the area around west end of the Harding Drain Bypass Pipeline.

Pipeline Construction

Open-cut construction

Open-cut construction (also referred to as open trench with shoring, or cut-and-cover) is the proposed option for installing the majority of the pipeline along existing roadways and private and municipal agricultural lands. The open-cut trench would range from 6 to 8 feet wide and approximately 8 to 10 feet deep, depending on the pipe size, existing utility locations, and pipe bedding requirements. Shoring would be required to provide trench stability. Open-cut construction would involve cutting, removing, and replacing pavement in existing paved areas. Where possible, the pipelines would be installed along the shoulder of the roads to minimize paving and traffic disruption.

To accommodate construction equipment and work area, the entire construction corridor (active work area including the trench) would be approximately 45 feet wide. Because of the limited width of the existing roads (especially Lemon Avenue, Zacharias Road, and Jennings Road) and the size of the trench and construction zone, it is expected that the construction may require full road closures unless temporary access for construction equipment can be provided along the shoulders of the road and/or adjacent property. If access can be provided along the roadway shoulders and adjacent property, only partial road closures with appropriate traffic control would be required. Otherwise segments of the affected roadway would be closed during pipeline installation activities and work would likely need to be conducted during late night/early morning hours to minimize traffic disruptions. Traffic control operations will be noticed at the location of the temporary traffic restrictions a week in advance of the any road work that

impedes the flow of traffic (i.e. closes the road, closes a traffic lane, or closes the road shoulder).

It is expected that open trench construction within paved roadways would proceed at the rate of 200 to 500 feet per day within rural areas. Excavated trench materials would be sidecast within approved work areas and reused as appropriate for backfill. Upon completion of pipeline installation, affected roadways would be repaved per the requirements of Stanislaus County. Open-cut construction would also be used within farmland. Some of the lands are fallowed while others are cultivated. Open-cut construction proposed for cultivated areas may require removal of the crop, depending on the crop and time of year. Temporary and permanent easements would be obtained from individual growers as needed.

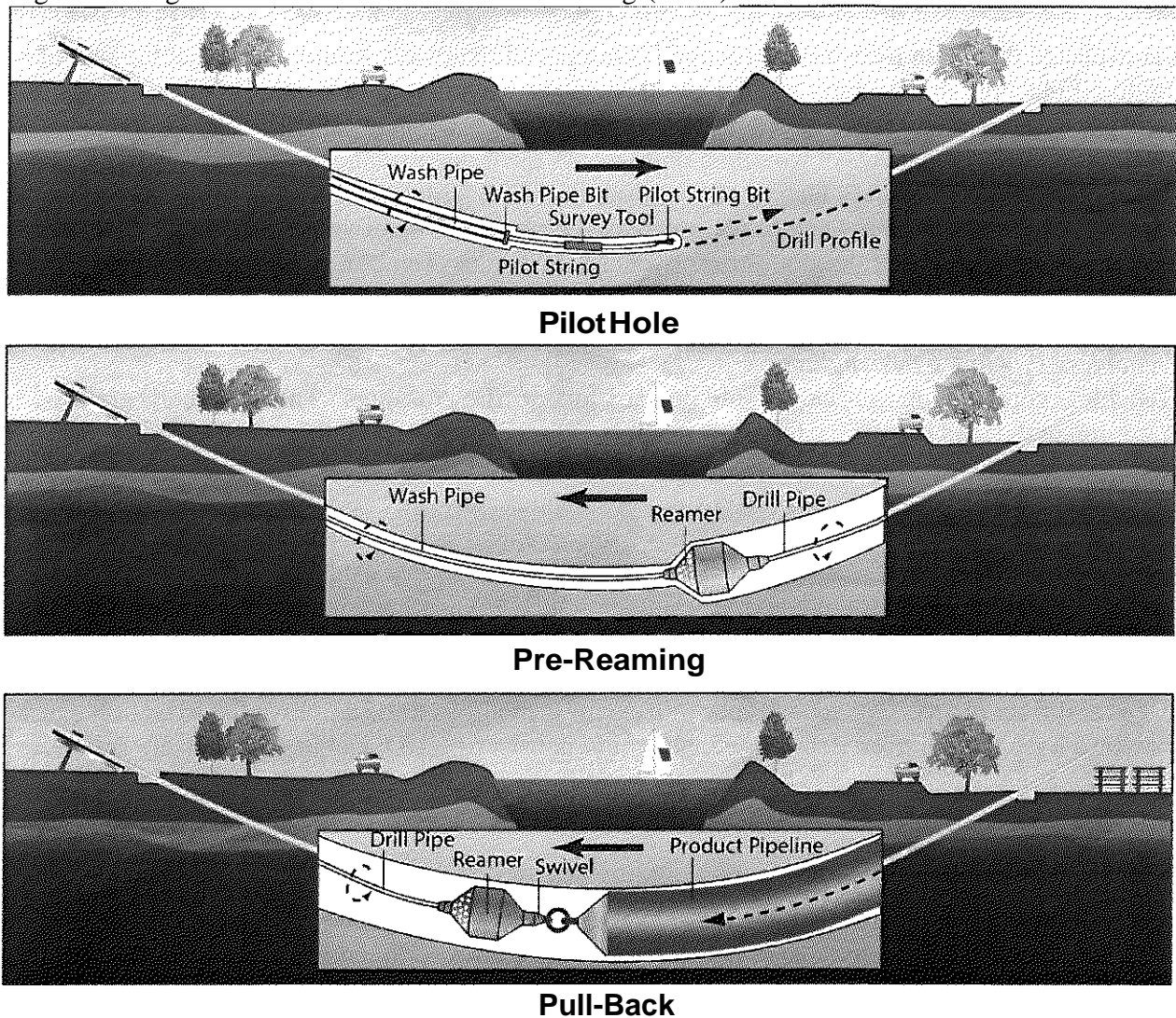
Trenchless Pipeline Construction

Trenchless construction methods would be used for specific crossings. These methods are used to minimize the area of surface disruption required for pipeline installation or where open-cut construction is not practical or not allowed. HDD would likely be used for crossing of SR 33 and the CFNR railroad, provided that a suitable geometric profile can be designed taking into consideration entry/exit angles, bend radius of the pipe, and sufficient room for pipe assembly and jacking. Otherwise, a pipe jacking methodology would be considered for those installations. The San Joaquin River crossing may be completed using microtunneling or HDD, depending on soil conditions and other design factors. For the San Joaquin River crossing, the launching and receiving pits would be located on either side of the waterway, outside the river levees and floodplains. The exact types of trenchless methods to be employed at irrigation canal crossings have not yet been determined, but could consist of HDD, jacking and boring, and/or microtunneling.

Horizontal Directional Drilling

HDD is a trenchless pipeline installation method that can be used for crossing major roadway intersections and waterways. HDD crossings are installed between an entry and exit pit (see Figure 4). HDD involves the use of a drill rig tilted at the top at an angle, typically in the range of 10 to 15 degrees from horizontal. A small diameter (4 to 8 inch diameter) pilot hole is first drilled along a pre-determined horizontal and vertical alignment from the entry pit to the exit pit. This pilot hole can be guided using electromagnetic readings transmitted from the drill bit back to the drill rig. Excavation takes place by introducing pressurized slurry (a thin mixture of water and clay) through a drill string to the bit. The slurry pressure in combination with a rotating drill bit excavates the material, which is then transported back to the entry pit along the outside of the drill string. In some cases, a larger diameter wash pipe may be rotated around the drill string to prevent sticking of the steerable string.

Figure 4: Diagram of Horizontal Directional Drilling (HDD) Process



Entry and exit pits are required at each side of the crossing. The pits are approximately 50 to 100 feet square by approximately 5 feet deep, and are used as the collection point for the fluid material removed during drilling, which is a mixture of the drilling slurry and spoil. This fluid is then pumped to a slurry separation plant to separate the spoil from the fluid so that the fluid can be reused. The pilot hole is then enlarged by pulling larger reamers (see Figure 5) from the pilot exit pit back towards the drilling rig. The pipeline is then pulled into place behind the last reamer.

The entry side requires a work area of approximately 1,500 to 3,000 square feet for the drill rig, slurry separation plant, material storage and other support equipment. The exit side requires a work area of about 1,000 to 1,500 square feet for the pullback. This area is exclusive of the area needed for the pipe assembly and laydown area. Typically, a corridor about 15 feet wide by the length of the pipe is needed for the buildup and laydown.

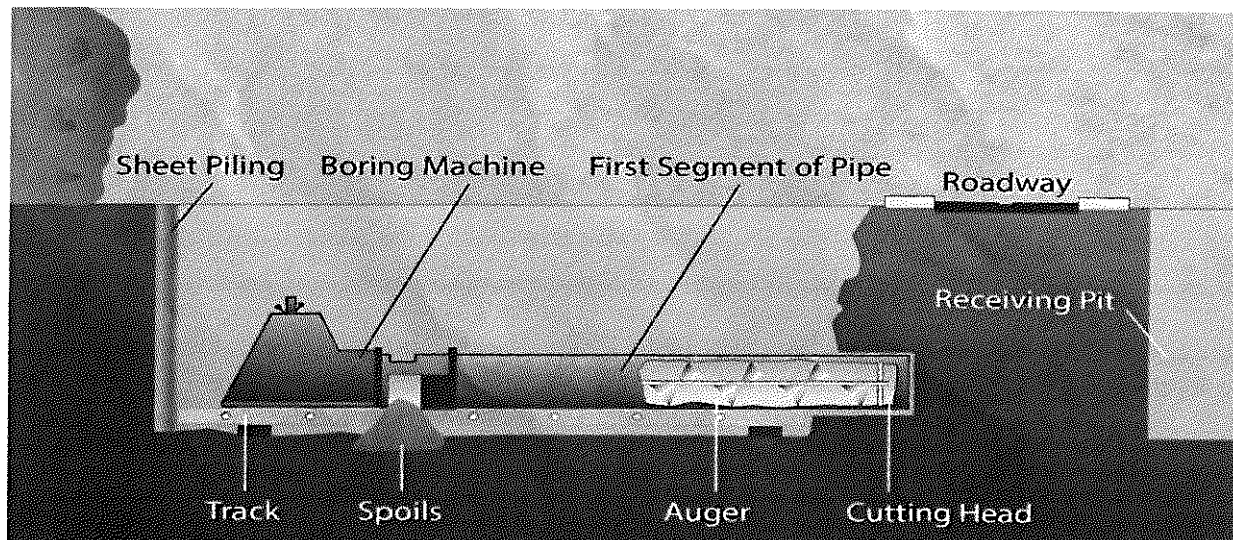
Pipes would be installed at varying depths depending on features being avoided, the existing underlying utilities, soil types, environmental constraints, entry and exit constraints, and bend radius of the installed product and drill pipe. Although the exact depths of the pits and drilling have not been defined as design has not yet been initiated, for the purpose of this analysis, it is assumed that the depth of construction would vary from 30 to 50 feet under the San Joaquin River bed and 10 to 15 feet under the highway/railroad/canals.

Pipeline installation using HDD at the San Joaquin River crossing would take about 3 to 4 months, and the SR 33/CFNR crossing would take approximately 4 to 6 weeks to complete.

Jack and Bore Construction

Jack and bore is a method that is often used for major roadway intersections and railroad crossings where crossings are generally less than 300 feet long and above the groundwater level. Jack and bore would require two pits that are excavated at each end of the pipeline to be installed (see Figure 5). A boring machine is inserted into one pit to bore the soil using an auger to remove material, a casing is pushed forward as material is removed until it reaches the receiving pit, and the pipe is inserted in the casing. The jacking pit is excavated (and shored) with typical dimensions of 8 to 12 feet wide and 25 to 35 feet long depending on the casing length selected. The depth would depend on the feature to be avoided, existing utilities, or separation requirements. The exact depths of the pits and drilling have not been defined because design has not yet been initiated; however, for the purpose of this analysis, it is assumed that the depth of construction would be on the order of 15 to 20 feet deep for canal, railroad and highway crossings. Jack and bore typically has very limited steering control and it is not the method of choice if precise line and grade control is required. Jack and bore is not feasible for the San Joaquin River crossing.

Figure 5: Diagram of Bore and Jack Process



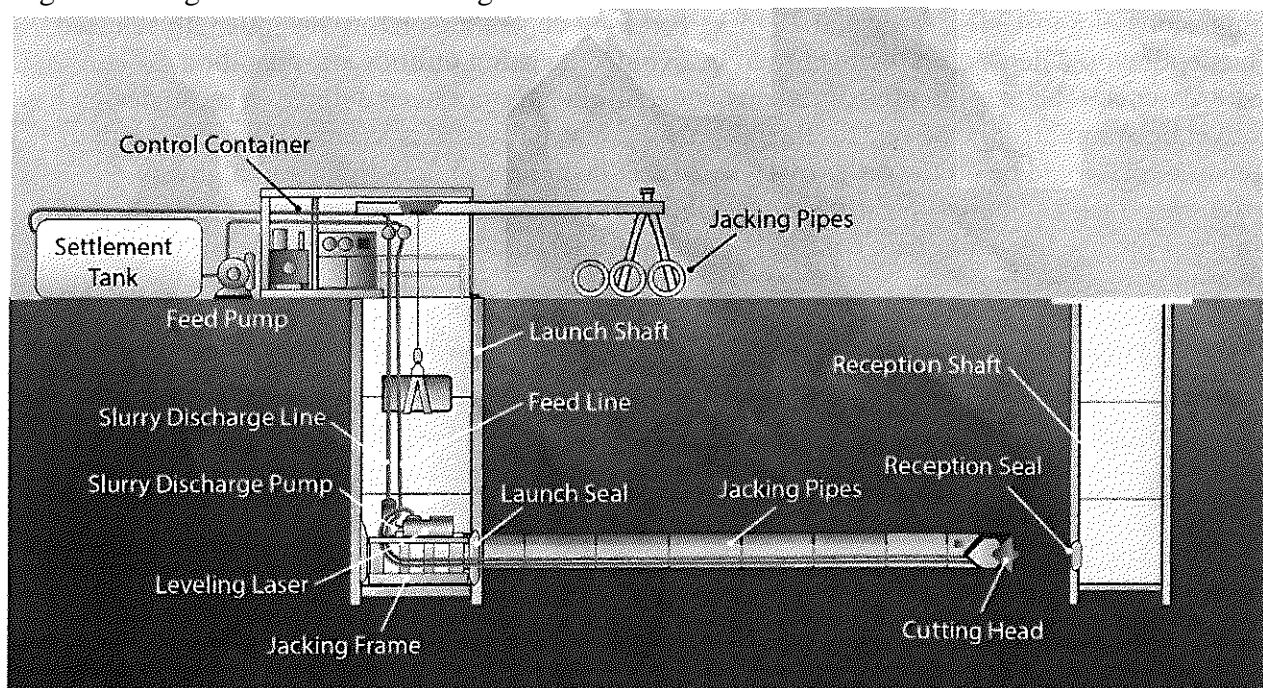
Shoring, appropriate to the pit depth, would be used to support the excavation. In addition, the back wall of the jacking pit would need to be constructed so as to withstand the reactive forces from the jacking frame. An additional area of about 1,500 to 2,000 square feet would be needed

around the pit for temporary storage of pipe sections and for loading material removed from the bore. The receiving pit at the other end of the crossing would be smaller, encompassing approximately 100 square feet. Pits and work areas would be located within existing ROW and along streets, where appropriate. Crossings of roadways would typically take three to five days. After pipeline construction and installation is complete, the work area would be restored to preconstruction conditions.

Microtunneling Construction

Microtunneling is a remotely-controlled pipe jacking process that can be used in saturated areas below the groundwater level. The microtunneling boring machine is advanced through the ground by incrementally adding jacking pipe segments to the end of the pipe string and advancing the pipe string from a jacking pit to a receiving pit on the opposite side of the crossing (see Figure 6). A cutting head excavates material at the face as the machine is jacked forward. The excavated material is mixed with clean slurry and pumped to the surface for separation and muck removal.

Figure 6: Diagram of Microtunneling Process



Jacking pits for microtunneling are typically 10 to 14 feet wide. The length is dictated by the pipe segment length that would be installed. Ten-foot segments require a pit about 15 feet long and 20-foot pipe segments require a pit about 25 feet long. Receiving pits are typically 12 to 16 feet square. Pit depths would vary depending on the feature being avoided, existing utilities, and the presence of soil layers that are more favorable to tunnel through than others. The exact depths of the pits and drilling have not been defined because design has not yet been initiated. For the purpose of this analysis, it is assumed that the depth of construction would be approximately 15 to 25 feet under the river channel. A microtunnel operation requires a work area (including the area of the pit) of approximately 2,000 to 3,000 square feet at the jacking pit.

The work area at the receiving pit can be smaller, but is typically a minimum of 1,000 square feet. Off-site staging areas can be used to reduce work areas.

Pipeline installation using microtunneling at the San Joaquin River crossing would take about 10 months, and the SR 33/railroad crossing would take approximately 4 to 6 weeks to complete.

Pump Station Construction

Modifications to the existing outfall pump station at Modesto's Jennings Plant would require removal and replacement of the three existing outdoor pumps and motors and a power transformer within the same footprint. The new pumps would be larger than existing pumps, requiring the existing openings in the top slab of the pump station to be enlarged. The existing switchgear and motor control center housed in the existing control building would need to be replaced with higher capacity equipment to accommodate the new pumps. Equipment would be accommodated adjacent to the project site during construction. The construction zone, including the footprint of the pump station, would be 50 by 50 feet, mainly for storage of equipment. Minimal excavation would be required.

Construction Equipment, Crew, Spoil, and Trip Generation

Construction Equipment and Crew Size

The installation of the proposed facilities would require, but is not limited to, the following equipment: excavator, backhoe, front-end loaders, pavement saw, dump trucks, diesel generator, water tank, water truck, flat-bed truck, drill rig, compactors, double transfer trucks for soil hauling, concrete trucks, dewatering equipment and paving equipment. Following are descriptions of typical construction operations for the proposed pipelines and pump stations.

Pipeline Installation

Prior to the start of excavation, asphalt would be cut where needed for the new pipe trench using large saw blades mounted on a special cart that would be pushed by a construction laborer. The asphalt would be lifted in large chunks and slabs from the cut area by a front-end loader or backhoe into a dump truck for off-hauling. The saw cutting operation would be relatively fast, with several hundred feet typically being cut within a few hours. Installation of dewatering wells may be required prior to start of excavation depending on the soil type and groundwater level. Water pumped from the excavation area must be properly disposed to nearby irrigation ditches or impoundments. Dewatering pumps would run continuously (24 hours per day) in the open trench areas while excavation is taking place, to maintain the groundwater level below the bottom of trench. After the pipeline is installed and backfilled, the dewatering pumps would be removed and relocated to the next segment of pipeline construction. Heavy equipment for excavation would follow, which typically involves continuous use of an excavator to fill dump trucks which would make intermittent trips to an off-site disposal area. Typically two or more dump trucks would be used to allow continuous offloading from the excavator. In addition, dump trucks hauling material from off-site sources for pipeline bedding and backfill would make semi-continuous trips to the site as pipe is being installed. A front-end loader would be used to lift pipe segments from a flat-bed delivery truck and position the pipe in the trench. Temporary trench plates and paving would be installed over the trench at the end of each work day. Final

paving and marking typically would be done for the entire pipeline length after installation. Trenchless pipe installation is described above and typically would involve use of a drill rig (for HDD) or jacking machine for 8 hours per day with associated mud collection pumps running simultaneously. It is assumed that two crews of up to 10 workers would be installing the pipelines at any one time.

Pump Stations

Modification of the existing Jennings Plant outfall pump station would involve only minor excavation for new power conduits and piping. Existing pumps would be removed from the structure using a boom truck or small crane. The pump cut-outs in the existing above-ground wet well slab would be enlarged using a concrete saw to accommodate the new pumps. New electrical gear would be installed inside the existing control building, and a new power transformer installed in the existing transformer location. Minor grading and concrete work may be needed for a new spill containment structure for the transformer. The new pumps would then be installed in the existing pump locations. Much of the existing pump discharge piping would likely be re-used, pending a condition assessment. One crew of approximately five members would construct the pump stations; pump station construction would be done in sequence.

Construction Spoil and Trip Generation

The amount of spoil generated would depend on the construction methods selected. Table 3 shows estimated cubic yards (CY) of spoil from pipeline construction.

Table 3: Spoil Generated by Pipeline Construction

Alternative/Facility	Spoil Quantity (CY)
Alternative 1-Combined Alignment	
Ooen trench construction	155,000
Trenchless construction at river	3,500

On a per day basis, assuming an average of 350 feet of pipeline would be constructed per day (200 days of construction) for Alternative 1, a maximum of 775 CY of material would be generated. This is equivalent to approximately 39 truck trips (20 CY haul, round trips) per day. In addition, a maximum of 26 truck trips (round trips) per day would be required for delivery of imported backfill, pipe, equipment, and other materials. For the new pump stations, the spoil generated from the wet well excavation would be approximately 600 CY, resulting in approximately 30 truck trips.

In addition to equipment and material delivery, a total of 8 worker trips (round trip) would be generated per day assuming each individual drives separately and half of the workers travel for lunch.

Construction-Related Water Requirements

Water, from water trucks, would be used during construction activities for dust control purposes. Water generated from the trench dewatering operations may also be usable for dust control.

Environmental Commitments

The following environmental commitments have been incorporated by Reclamation into the Proposed Action to avoid and minimize potential effects on fish, wildlife, and plant species.

Mitigation Measure BIO-1a: Avoid or Minimize Impacts to Special-Status Plant Species

To the extent feasible, project-related activities shall avoid habitats with the potential to support special-status plants, including alkali flats, alkali scrub, alkali pools, and freshwater wetlands. To the extent feasible, the proposed project shall minimize potential impacts to special-status plants by utilizing trenchless construction techniques within habitats with the potential to support special-status plants.

Mitigation Measure BIO-1b: Perform Focused Surveys for Special-Status Plant Species in Suitable Habitats

Within one year prior to commencement of construction activities, a qualified botanist shall perform surveys for special-status plant species within potentially suitable habitat in the vicinity of open-cut construction areas. Floristic surveys shall be performed according to the *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities* (CDFG 2009). Floristic surveys shall include the use of a reference population, as reasonably feasible, to increase the likelihood of detection, and shall be performed during the appropriate bloom period(s) for each species. If special-status plants are detected within a 100-foot radius or within the microwatershed of an open-cut construction area (including pits that would be used for trenchless construction), **Mitigation Measure BIO-1c** shall be implemented.

Mitigation Measure BIO-1c: Monitor or Compensate for Impacts to Special-Status Plant Species

The locations of special-status plants within the microwatershed or within 100 feet of construction areas shall be marked and the size of the population shall be recorded. Locations of special-status plant populations shall be clearly identified in the field by staking, flagging, or fencing. The plants shall be monitored throughout the duration of construction to determine if the project has resulted in adverse effects (direct or indirect), as determined by a qualified botanist.

Mitigation Measure BIO-1d: Develop and Implement a Frac-out Contingency Plan for Trenchless Construction

Prior to constructing a crossing(s) of the San Joaquin River, a Frac-out Contingency Plan shall be developed. A "frac-out" is an uncontrolled release of drilling fluids during trenchless construction. At minimum, the plan shall prescribe the measures to ensure protection of aquatic resources, special-status plants and wildlife, including:

- Procedures to minimize the potential for a frac-out associated with horizontal directional drilling;
- Procedures for timely detection of frac-outs;
- Procedures for timely response and remediation in the event of a frac-out; and
- IV!onitoring of drilling and frac-out response activities by a qualified biologist.

Mitigation Measure BI0-2a: Avoid Impacts to Vernal Pool Branchiopods and Their Habitat

To the extent feasible, the project-related activities shall avoid impacts to habitat with the potential to support vernal pool fairy shrimp (*Branchinecta lynchi*) and vernal pool tadpole shrimp (*Lepidurus packardii*), including alkali pools and swales. Avoidance shall be defined as no direct or indirect effects to suitable habitat. This shall be accomplished by avoiding construction within the microwatershed of suitable habitat for vernal pool branchiopods.

Mitigation Measure BI0-2b: Minimize and Compensate for Impacts to Vernal Pool Fairy Shrimp and Their Habitat

If direct or indirect impacts to habitat with the potential to support vernal pool branchiopods cannot be avoided then the following measures shall be implemented:

- Implement a storm water pollution prevention plan (SWPPP) to reduce the potential for sediments and contaminants to enter pools or depressions where vernal pool branchiopods may occur;
- After construction, restore surface topography and drainage to pre-construction conditions; and
- Provide off-site compensation for permanent, temporary, and indirect impacts at ratios determined through consultation with the Service. The performance standard shall be no net loss in acreage or habitat quality for vernal pool branchiopods, as determined through consultation with the Service.

Mitigation Measure BI0-3a: Avoid Impacts to Valley Elderberry Longhorn Beetle

To the extent feasible, the project shall adhere to avoidance measures outlined in the Service's *Conservation Guidelines for Valley Elderberry Longhorn Beetle* (Service 1999). This shall include the following avoidance measures:

- No less than 120 days prior to commencing construction, the locations of elderberry plants within 200 feet of open-cut construction areas shall be identified;
- Fence and flag all areas to be avoided during construction activities including all established elderberry shrubs within 200 feet of open-cut construction that will not be impacted by construction activities;
- No open-cut construction within 100 feet of the dripline of elderberry plants containing stems measuring 1.0 inch or greater in diameter at ground level;

- Construction personnel shall participate in a Contractor Environmental Awareness Training (CEAT). The CEAT shall communicate the need to avoid damaging the elderberry plants and the possible penalties for not complying with these requirements. The CEAT will instruct work crews about the status of the valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*)(VELB) and the need to protect its elderberry host plant;
- Erect signs every 50 feet along the edge of the avoidance area with the following information: "This area is habitat of the valley elderberry longhorn beetle, a threatened species, and must not be disturbed. This species is protected by the Endangered Species Act of 1973, as amended. Violators are subject to prosecution, fines, and imprisonment." The signs will be maintained for the duration of construction; and
- No insecticides, herbicides, fertilizers, or other chemicals that might harm the beetle or its host plant would be used within 100 feet of any elderberry plant.

Mitigation Measure BI0-3b: Minimize or Compensate for Impacts to Valley Elderberry Longhorn Beetle

If elderberry plants occur within 100 feet of open-cut construction, their locations shall be reported to the Service. In areas where encroachment on the 100-foot buffer has been approved by the Service, a minimum setback of at least 20 feet from the dripline of each elderberry plant shall be provided, as feasible. For any encroachment into the 100-foot buffer or removal of elderberry plants, the Partner Agencies shall implement measures to compensate for impacts to VELB. Compensation measures shall be consistent with the Service's *Conservation Guidelines for Valley Elderberry Longhorn Beetle* (Service 1999). This shall include establishment of a project-specific VELB Conservation Area or purchase of credits at a Service-approved mitigation bank. If the Partner Agencies establish a project-specific Conservation Area, the population of VELBs, the general condition of the Conservation Area, and the condition of the elderberry and associated native plantings in the Conservation Area shall be monitored over a period of ten (10) years. Monitoring and reporting shall be conducted in accordance with the Conservation Guidelines for VELB (Service 1999). A minimum survival rate of at least 60 percent of the elderberry plants and 60 percent of the associated native plants shall be maintained throughout the monitoring period.

Mitigation Measure BI0-6: Avoid and Minimize Impacts to Giant Garter Snake

The following measures shall be implemented to avoid or minimize impacts to the giant garter snake (*Thamnophis gigas*)(GGS):

- Trenchless construction techniques shall be used to construct the pipeline crossing in potential aquatic habitat for GGS;
- Construction personnel shall participate in a Contractor Environmental Awareness Training (CEAT). Under this program, workers shall be informed about GGS and

habitat, the species life history, conservation goals, identification of the snake, and procedures to follow in the event of a possible sighting;

- Within 24-hours prior to commencement of construction activities, the site shall be inspected by a qualified biologist who is approved by the Service. The biologist shall provide the Service with a field report form documenting the monitoring efforts within 24-hours of commencement of construction activities. A qualified biologist shall be on-site during all construction activity within 200 feet of potential habitat for GGS. If a snake is encountered during construction activities, the biologist shall have the authority to stop construction activities until appropriate corrective measures have been completed or it is determined that the snake would not be harmed;
- Erosion control materials including silt curtains, silt fencing, and erosion control wattles shall be regularly inspected for entanglement or entrapment of the snake;
- Stockpiling of construction materials, portable equipment, vehicles, and supplies shall be restricted to the designated construction staging areas which shall be greater than 200 feet from GGS aquatic habitat;
- Clearing of wetland vegetation, if any, shall be confined to the minimal area necessary to construct the pipeline or intake; and
- After completion of construction activities, any temporary fill and construction debris shall be removed. Disturbed areas shall be restored to pre-project conditions. Restoration work shall include replanting native emergent vegetation, where appropriate.

Mitigation Measure BI0-8: Avoid and Minimize Impacts to Western Pond Turtle

The following measures shall be implemented to avoid or minimize impacts to western pond turtle (*Actinemys marmorata*):

- To the extent feasible, trenchless construction techniques shall be used where pipelines cross potential aquatic habitat for western pond turtle;
- Construction personnel shall participate in a Contractor Environmental Awareness Training (CEAT). Under this program, workers shall be informed about western pond turtle and their habitat, conservation goals, identification, and procedures to follow in the event of a possible sighting; and
- Pre-construction surveys for western pond turtle shall be conducted by a qualified biologist 14 days before and 24 hours before the start of construction activities where suitable habitat exists. If western pond turtle or their nests are observed during pre-construction surveys, the following measures shall be implemented:
 - A qualified biologist shall be on site to monitor construction in suitable habitat. If a western pond turtle is present within 50 feet of a construction area, no vegetation clearing or ground disturbing activities shall be conducted until the turtle leaves the area on its own volition.
 - If western pond turtle nests are identified in the work area during pre-construction surveys, a 100-foot no-disturbance buffer shall be established between the nest and any areas of potential disturbance. Buffers shall be

clearly marked with temporary fencing. Construction shall not be allowed to commence in the exclusion area until hatchlings have emerged from the nest, or the nest is deemed inactive by a qualified biologist.

Mitigation Measure BI0-9: Avoid, Minimize, or Compensate for Impacts to Burrowing Owl

Prior to initiating ground-disturbing activities, surveys for burrowing owls (*Athene cunicularia*) shall be conducted in accordance with protocols established in the *Staff Report on Burrowing Owl Mitigation* (CDFG 2012 or current version). If ground-disturbing activities are delayed or suspended for more than 30 days after the pre-construction survey, the site shall be resurveyed. If burrowing owls are detected, disturbance to burrowing owls shall be avoided during the nesting season (February 1 through August 31). Buffers shall be established around occupied burrowing owls in accordance with guidance provided in the *Staff Report on Burrowing Owl Mitigation*, and at the discretion of a qualified wildlife biologist. Buffers around occupied burrowing owls shall be a minimum of 656 feet (200 meters) during the breeding season, and 160 feet (100 meters) during the non-breeding season. Buffer distances shall be subject to the approval of California Department of Fish and Wildlife (CDFW).

If occupied burrowing owls cannot be avoided, passive owl relocation techniques may be implemented outside of the nesting season (February 1 through August 31). Owls would be excluded from burrowing owls within 160 feet of construction by installing one-way doors in burrowing owl entrances. The work area shall be monitored daily for 1 week to confirm owl departure from burrowing owls prior to any ground-disturbing activities. Where possible burrowing owls shall be excavated using hand tools and refilled to prevent reoccupation. Sections of flexible plastic pipe shall be inserted into the tunnels during excavation to maintain an escape route for any animals inside the burrowing owl.

If occupied burrowing owls are relocated, the Partners Agencies shall enhance or create burrowing owl habitat in adjacent habitat at a 1:1 ratio (burrowing owls destroyed to burrowing owls enhanced or created) one week prior to implementation of passive relocation techniques. If burrowing owl habitat enhancement or creation takes place, the Partners Agencies shall develop and implement a monitoring and management plan to assess the effectiveness of the mitigation. The plan shall be subject to the approval of CDFW.

Mitigation Measure BI0-10: Avoid and Minimize Impacts to Tricolored Blackbird Nesting Colonies

The following measures shall be implemented to avoid or minimize impacts to tricolored blackbird (*Agelaius tricolor*):

- To the extent feasible, trenchless construction techniques shall be used in potential nesting habitat for tricolored blackbird;
- During the breeding season (February 1 through August 31), pre-construction surveys for tricolored blackbird shall be conducted in suitable nesting habitat by a qualified biologist no more than 15 days prior to scheduled work. Suitable nesting habitat

includes any of the foJlloving: (a) dense vegetation near open water; (b) emergent marsh vegetation, especially cattails and bulrush; (c) thickets of willow, blackberry, wild rose, or thistles; or (d) silage and other grain fields such as sorghum; and

- Iftricolored blackbird breeding is detected, a 500 foot no-disturbance buffer shaJI be established around the breeding site. The buffer shaJI be maintained until aqualified biologist has determined that young have fledged and are no longer reliant upon the nest or parental care for survival.

Mitigation Measure BI0-12: Avoid, Minimize, or Compensate for Impacts to Raptors including Special-status species

- Ifground and vegetation disturbing activities occur between February 1 and September 15, a nesting raptor survey, with a focus on Swainson's hawk (*Buteo swainsoni*) and white-tailed kite (*Elanus leucurus*), shall be conducted in accordance with *Recommended Timing and Methodology for Swainson's Hawk Nesting Survey's in California's Central Valley* (Swainson's Hawk Technical Advisory Committee 2000, or current CDFW guidance). Surveys shaJI cover a minimum of a 0.5-mile radius around potentially suitable nesting habitat for Swainson's hawk and white-tailed kite. Agricultural lands within 1,000 feet of open-cut construction areas shaJI be surveyed for northern harrier (*Circus cyaneus*) nests.
- Ifnesting raptors are detected, a no-disturbance buffer shall be established around the nest. Buffers shall be 0.25 mile for Swainson's hawk and white-tailed kite, and 500 feet for northern harrier and non-listed raptors. A qualified biologist may identify an alternative buffer based on a site specific-evaluation and in consultation with CDFW. No construction activities shall be initiated within the buffer until fledglings are fully mobile and no longer reliant upon the nest or parental care for survival. Construction must either be started before nests are established, or if nesting birds are already present, construction within the buffer zone would have to be delayed until nesting is done for the season.
- Ifan active Swainson's hawk or white-tailed kite nest is located within a 0.5-mile radius of an active work area, a biologist shall be on site daily to monitor the nest. The biologist shall monitor for behavioral changes that would suggest the birds are stressed by construction activity or the nest may be abandoned. Such behaviors may include excessive vocalization, a startled response coincident with a loud noise or changes in the viewshed, or prolonged absence from the nest by adults. Ifthe biologists detelmines that nest success may be adversely impacted by construction, then construction shaJI be discontinued within 0.5 mile of the nest.
- Trees that would need to be removed for construction would be surveyed to determine if they are suitable for raptor nesting.
- Ifpotential raptor nesting trees are to be removed during construction activities, removal shall take place outside of Swainson's hawk nesting season. Suitable nest trees for raptors shaJI be replaced at a ratio of 3:1 with appropriate species (e.g., *Quercus lobata*, *Q. agrifolia*., *Populus fremontii*). The trees shall be planted within 5 miles of the removal location, in areas appropriate raptor nesting, and on land owned or managed by one of the Partner Agencies. Ifreplacement planting is implemented,

monitoring shall be conducted annually for 5 years to assess the mitigation's effectiveness. The performance standard for the mitigation shall be 65% survival of all replacement plantings.

Mitigation Measure BI0-13: Avoid and Minimize Impacts to Special-status passerine species and other Birds Protected under the Migratory Bird Treaty Act (MBTA)

- If ground and vegetation disturbing activities occur between February 1 and September 15, a survey for nesting birds shall be conducted within a 500-ft radius of the construction area. If nests are detected, buffers around nests shall be established. No-disturbance buffers around special-status passerine nests shall be 500 feet and 250 feet for non-listed birds protected under the MBTA and Fish and Game Code sections 3503 and 3513, unless a qualified CDFW biologist determines that smaller buffers shall be sufficient to minimize impacts to nesting birds. Factors to be considered for determining buffer size shall include: the presence of natural buffers provided by vegetation or topography; nest height; locations of foraging territory; and baseline levels of noise and human activity. Buffers shall be maintained until a qualified biologist has determined that young have fledged and are no longer reliant upon the nest or parental care for survival.
- Prior to commencing a crossing(s) of the San Joaquin River or construction of an expanded intake facility on the river, the Project Partners shall conduct surveys for least Bell's vireo (*Vireo bellii pusillus*) (LBV) in accordance with Service's Least Bell's Vireo Survey Guidelines (Service 2011 a). If LBV are detected during the surveys, the Project Partners shall consult with the Service to determine appropriate avoidance measures. The performance standard for avoidance shall be no potential impacts to an established LBV nest. This shall be accomplished by establishing a no-disturbance buffer around the active nest. The no-disturbance buffer shall be a minimum of 500 feet, but may be larger depending on site specific conditions and consultation with the Service.

Mitigation Measure BI0-14a: Avoid and Minimize Impacts to San Joaquin kit fox

- Project-related activities will avoid affecting the alkali scrub/flat habitat in the action area. Avoidance is defined as no direct or indirect effects to habitat.
- A qualified biologist will conduct preconstruction surveys no less than 14 days and no more than 30 days before the commencement of activities to identify potential San Joaquin kit fox (*Vulpes macrotis mutica*) dens more than 5 inches in diameter within 200 feet of ground disturbing activities. The Project Partners will implement the Service's (2011b) *Standardized Recommendations for Protection of San Joaquin Kit Fox Prior to or During Ground Disturbance*. The Project Partners will notify the Service in writing of the results of the preconstruction survey within 30 days after these activities are completed.
- If potential 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. If occupied dens are present within the proposed work, their

disturbance will be avoided. Exclusion zones will be implemented following the most current Service procedures (currently Service 201 lb). The Project Partners will notify the Service immediately if a natal or pupping den is found in the survey area, and will present the results of pre-activity den searches within 5 days after these activities are completed and before the start of construction activities in the area.

Mitigation Measure BI0-16a: Avoid and Minimize Impacts to Federally Protect Wetlands

To the extent feasible, project-related activities shall avoid federally protected wetlands. To the extent feasible, the proposed project shall minimize potential impacts to federally protected wetlands by utilizing trenchless construction techniques. A SWPPP shall be implemented to reduce the potential for sediments and contaminants to enter wetlands and waters. After construction, surface topography and drainage shall be restored to pre-construction conditions. Where appropriate, revegetation shall be implemented with site-adapted native species.

Mitigation Measure BI0-16b: Obtain Regulatory Permits for Work Activities Taking Place in Wetlands and Waters of the United States and the State

Work within areas defined as waters of the U.S. that includes placement of fill will require a CWA Section 404 permit and Section 401 Water Quality Certification. All work proposed in jurisdictional waters of the U.S. shall be authorized under these permits, and the work shall comply with the general and regional conditions of the permits. In areas where disturbance to jurisdictional waters or wetlands occurs, the Partner Agencies shall implement mitigation consistent with the terms of a CWA Nationwide Permit and/or the Final Rule on Compensatory Mitigation for Losses of Aquatic Resources (73 CFR 19594). Compensatory mitigation may include creation, re-establishment, or enhancement of wetlands in the Project Area or at an off-site location. Compensatory mitigation may also include purchase of credits at an approved mitigation bank or contribution to an approved in-lieu fee program.

EXISTING BIOLOGICAL RESOURCES

Agricultural Lands

Agricultural lands within and adjacent to the Project Area include flood irrigated pastures, orchards, and row crops. Pastures are typically cultivated in alfalfa (*Medicago sativa*), rescue grass (*Bromus catharticus*), Johnson's grass (*Sorghum halepense*), tall fescue (*Festuca arundinaceae*), and Italian ryegrass (*Festuca perennis*). The primary orchard crops in the vicinity of the Project Area are apricot (*Prunus armeniaca*), English walnut (*Juglans regia*), and almond (*Prunus dulcis*) cultivars (City of Patterson 2010). Row crops include broccoli (*Brassica oleracea*), corn (*Zea mays*), and tomatoes (*Solanum lycopersicum*), among others.

Flood irrigated pastures provide food, cover, and nesting grounds for wildlife species; the value of the habitat varies with crop type and agricultural practices. Bird diversity can be high in irrigated pastures (Hartman and Kyle 2010). Species commonly utilizing pasture lands include

tricolored blackbird, red-winged blackbird (*Agelaius phoeniceus*), Brewer's blackbird (*Euphagus cyanocephalus*), western meadowlark (*Sturnella neglecta*), European starling (*Sturnus vulgaris*), house finch (*Carpodacus mexicanus*), killdeer (*Charadrius vociferous*), American crow (*Corvus brachyrhynchos*), and American kestrel (*Falco sparverius*). Some pasture lands and crop fields provide suitable breeding habitat for northern harrier. Small mammals in flood irrigated pasture and row crops provide important prey resources for raptors such as red-tailed hawk (*Buteo jamaicensis*) and Swainson's hawk.

In orchards, the understory vegetation that provides food and cover for wildlife is generally removed, limiting the abundance and diversity of wildlife species. Species such as the side-blotched lizard (*Uta stansburiana*) can occur in this habitat type. American crow and yellow-billed magpies (*Pica nuttalli*), which forage on nut crops, are often present (City of Patterson 2010). Approximately 24 acres of agricultural lands would be temporarily impacted and possibly 2 acres permanently impacted within the North Valley Regional Recycled Water Program project area.

Ruderal

Much of the Study Area is situated within access roads and road shoulders that support a ruderal vegetation community. This vegetation type is characterized by early colonizing species of disturbed and degraded areas. Community composition includes non-native annual grasses such as mouse barley (*Hordeum murinum* ssp. *leporinum*), rip-gut brome (*Bromus diandrus*), and red brome (*B. madritensis* ssp. *rubens*). Other species present within this community type include non-native, often invasive thistle species such as spiny sow's thistle (*Sonchus asper*), milk thistle (*Silybum marianum*), star thistles (*Centaurea* spp.) and Italian thistle (*Carduus pycnocephalus*). Although the ruderal plant community is generally limited to herbaceous species, there are several mature, native trees located in this community type along roadways, particularly along Jeunings Road and West Main Avenue.

Due to sparse vegetative cover and frequent disturbance, ruderal habitats provide limited value to wildlife. Species such as mourning dove (*Zenaida macroura*) and killdeer forage and nest in this community type. The mature trees along the roadways provide perches and nesting habitat for raptors such as red-tailed hawk.

Ruderal herbaceous habitat provides food and cover for a variety of wildlife species. Some of these include the California vole (*Microtus californicus*), Botta's pocket gopher (*Thomomys bottae*), western harvest mouse (*Reithrodontomys megalotis*), house mouse (*Mus musculus*), western fence lizard (*Sceloporus occidentalis*), common garter snake (*Thamnophis sirtalis*), lesser goldfinch (*Carduelis psaltria*), white-crowned sparrow (*Zonotrichia leucophrys*), and red-winged blackbird. During site visits, a large number of red-winged blackbirds were observed using ruderal herbaceous habitat within the project site and may include use as breeding habitat. Red-winged blackbirds are known to nest in herbaceous weeds near water, in addition to nesting in cattail marshes (Stokes 1979).

Approximately 30 acres of ruderal habitat would be temporarily impacted within the Project Area.

Riparian Woodland

Valley Oak Riparian Forest

In the Study Area, valley oak (*Quercus lobata*) riparian forest occurs on the topographically higher portions of the San Joaquin River floodplain and along the large natural drainage to the west of the San Joaquin River. This community type is characterized by large, mature valley oaks in the overstory. The canopy is open to semi-closed. Understory vegetation is generally limited to herbaceous species and vines. Non-native grasses are dominant in the understory along the San Joaquin River. Perennial pepperweed (*Lepidium latifolium*) is dominant in the understory along the channel to the west of the river.

Valley oak riparian forests support 67 nesting bird species (Gaines 1980). Swainson's hawk use large valley oaks as nesting sites (Schlorff and Bloom 1984). These forests provide habitat for the yellow-billed cuckoo (*Coccyzus americanus*), valley elderberry longhorn beetle, and remnant populations of ringtail (*Bassariscus astutus*) in the Central Valley (Belluomini et al 1984). Valley oak is used by various cavity-nesting and cavity-storing birds and mammals. It supplies browse for livestock, black-tailed deer (*Odocoileus hemionus*), lagomorphs, and various rodents. Pocket gopher, California ground squirrel (*Otospermophilus beecheyi*), and deer mouse (*Peromyscus maniculatus*) are heavy consumers of valley oak seedlings. Acorns are an important diet item of the California ground squirrel, pocket gopher, western scrub jay (*Aphelocoma californica*), yellow-billed magpie, acorn woodpecker (*Melanerpes formicivorus*), black-tailed deer, feral pig, and of cattle.

No valley oak riparian forest would be impacted within the Project Area.

Willow Riparian Woodland

Willow riparian woodland is the dominant community in the San Joaquin River corridor in the Project Area. This vegetation community can best be characterized as Black Willow thicket (Sawyer et al. 2009) or Willow Riparian (Moise and Hendrickson 2002). Black willow (or Gooding's willow, *Salix gooddingii*) composes a minimum of 50% of the canopy cover within this vegetation alliance (Sawyer et al. 2009). Fremont's cottonwood (*Populus fremontii*) may be a co-dominant in the overstory canopy. The shrub component of this vegetation type may be composed of willow species (*Salix lasiolepis*, *S. laevigata* and *S. lucida* ssp. *lasiandra*). Button willow (*Cephalanthus occidentalis*) may dominate along the river banks. Within the Study Area, black willow composes 70% or more of the overstory and button willow and young black willow dominate the shrub component; arroyo willow (*Salix lasiolepis*) is also abundant. Various wetland and mesic graminoids (grasses and grass-like plants including rushes and sedges) and forbs are present in the understory depending on the depth to ground water and proximity to the river. Saturated soils and areas with shallow stagnant water are dominated by bulrush (*Schoenoplectus* spp.). River banks and open water support the invasive water hyacinth (*Eichhornia crassipes*) and floating primrose willow (*Ludwigia pep/aides*). Unsaturated soils located outside the lower floodplain of the river are dominated by mugwort (*Artemisia douglasiana*), stinging nettle (*Urtica dioica*), and poison hemlock (*Conium maculatum*).

Riparian woodlands provide cover, food, and nesting habitat for a variety of wildlife species. Raptor species such as great horned owl (*Bubo virginianus*), red-tailed hawk, red-shouldered hawk (*Buteo lineatus*), Swainson's hawk, white-tailed kite, and American kestrel may nest and forage in riparian woodland. Passerine species such as belted kingfisher (*Megasceryle alcyon*), downy woodpecker (*Picoides pubescens*), northern flicker (*Colaptes auratus*), ash-throated flycatcher (*Myiarchus cinerascens*), oak titmouse (*Baeolophus inornatus*), black phoebe (*Sayornis nigricans*), bushtit (*Psaltiriparus minimus*), Bewick's wren (*Thryomanes bewickii*), lazuli bunting (*Passerino amoena*), blue grosbeak (*Passerino caerulea*), and species of goldfinches (*Carduelis* spp.) also commonly occur in this habitat. Mammals such as raccoon (*Procyon lotor*), desert cottontail (*Sylvilagus audubonii*), striped skunk (*Mephitis mephitis*), American beaver (*Castor canadensis*), and coyote (*Canis latrans*) are common in riparian woodlands.

Riparian areas provide food, water, and shade for resident species of wildlife as well as other species associated with adjacent habitats. The multiple layers of riparian vegetation in association with edges of adjacent plant communities create a diverse physical structure that provides cover for a diversity of amphibians, reptiles, birds, and mammals, including the Pacific chorus frog, garter snake, western pond turtle, and black phoebe (*Sayornis nigricans*). Riparian habitats provide important habitat for several species of neotropical migrant birds, such as Wilson's warbler (*Cardellina pusilla*) and yellow-breasted chat (*Icteria virens*). Riparian communities also function as important dispersal and migration corridors for many wildlife species.

No willow riparian woodland would be impacted within the Project Area.

Alkali Scrub/Alkali Flat

In the Study Area, alkali scrub occurs on the river side of the flood control levee near the Harding Drain. This area is dominated by Australian saltbush (*Atriplex semibaccata*) and big saltbush (*Atriplex lentiformis*). An alkali flat/scrub community occurs adjacent to the Study Area on the south side of West Main Avenue. Dominant species in this area include iodine bush (*Allenrolfea occidentalis*), alkali heath (*Frankenia salina*), saltgrass (*Distichlis spicata*), Mediterranean barley (*Hordeum marinum* ssp. *gussoneanum*) and tumbling saltweed (*Atriplex rosea*). These areas are remnant patches of the expansive alkali habitats that were once present in the San Joaquin Valley.

Alkali habitats support a diversity of wildlife and often rare species, but the alkali habitats in the Study Area are small and disconnected from large tracts of this habitat type. Thus, they are unlikely to support rare species associated with these habitats such as San Joaquin whipsnake (*Masticophis flagellum ruddocki*) and San Joaquin kit fox. More common generalists such as desert cottontail, side-blotched lizard, and various passerine birds are likely to be present.

No alkali habitats would be impacted within the Project Area.

Riverine

Riverine habitat in the Study Area includes the main channel of the San Joaquin River. In the Study Area, the river is a low gradient, sand/silt-bed channel with moderate to high sinuosity. Streamflow is perennial. The river is one of the most heavily dammed and diverted rivers in the state. While land use changes and water diversions have substantially reduced the flow and degraded habitat, the river remains an important wildlife corridor in the Central Valley. For example, Chinook salmon (*Oncorhynchus tshawytscha*) and a small number of steelhead (*O. mykiss*) migrate through this portion of the river to reach spawning habitat in the Merced River. White sturgeon (*Acipenser transmontanus*) and possibly green sturgeon (*A. medirostris*) also occur in this reach of the San Joaquin River (Jackson and Van Eenennaam 2013). Other native fish species that likely occur in this portion of the river include hardhead (*Mylopharodon conocephalus*), Pacific lamprey (*Entosphenus tridentatus*), Kem brook lamprey (*Lampetra hubbsi*), and prickly sculpin (*Cottus asper*). However, reduced flows, high water temperatures in the summer, and degraded water quality have adversely affected the habitat quality for many native fish species, resulting in a greater number of introduced species that are tolerant of these conditions. Introduced species include common carp (*Cyprinus carpio*), channel catfish (*Ictalurus punctatus*), white catfish (*Ictalurus catus*), fathead minnow (*Pimephales promelas*), red shiner (*Cypriella lutrensis*), and largemouth bass (*Micropterus salmoides*). Herpetofauna that commonly use the river and off-channel aquatic habitats include western pond turtle, Sierran treefrog (*Pseudacris sierra*), and American bullfrog (*Lithobates catesbeianus*).

No riverine habitat would be impacted within the Project Area.

Sloughs and Drainages

As described previously in this section, land adjacent to the river was historically characterized by a complex network of sloughs and side channels. While most of these waterways have been filled, two large drainages that retain "natural" channel characteristics (e.g., sinuosity, non-uniform bed and banks) remain intact in the Study Area: one on the east side of the river, and one on the west. The drainage located east of the river flows adjacent to the City of Modesto Police Department shooting range, alkali habitat south of West Main Avenue, and the Modesto Wastewater Treatment Plant spray fields. In general, this drainage has steep banks, which are armored with rip-rap in many locations. Large stands of bulrush are dispersed throughout the drainage. Floating aquatic vegetation such as Ludwigia (*Ludwigia pepeloides*) is also common.

The drainage to the west of the river has the characteristic of a backwater channel or abandoned slough. Flow is likely slow or stagnant throughout most of the year. This channel does not have abundant emergent or aquatic vegetation, but there is a considerable amount of woody debris. Stream banks are gently sloped.

The natural drainages likely support an assemblage of fishes tolerant of warm water and low oxygen conditions such as mosquitofish (*Gambusia affinis*). Ducks and wading birds, such as great blue heron (*Ardea herodias*) and egrets, forage in these drainages. Both drainages provide potentially suitable habitat for western pond turtle, and the drainage on the east side of the river

provides potentially suitable habitat for giant garter snake. These drainages are also used by semi-aquatic rodents such as nutria (*Myocastor coypus*) or muskrat (*Ondatra zibethicus*).

No sloughs and natural drainages would be impacted within the Project Area.

Constructed or Modified Drainages

The project's proposed alignments cross numerous drainage facilities and irrigation ditches. These water conveyance features vary considerably in scale and character. Some of the larger drainage features, such as the Harding Drain, have channel widths of 10 to 20 feet and support tall emergent vegetation such as cattail (*Typha* spp.) and bulrush. The smaller drain facilities support less vegetation.

Wildlife species that may utilize the larger constructed drainage facilities are similar to those described for the natural drainages above. The large drainage facilities with tall emergent vegetation support nesting of species such as red-winged blackbird and marsh wren (*Cistothorus palustris*). They provide suitable habitat for western pond turtle and giant garter snake. The smaller drainage facilities provide more limited wildlife habitat, but some support invertebrate production and avian foraging.

1.4 acres of constructed or modified drainages would be temporarily impacted within the Project Area.

Canals

Canals in the Study Area include the DMC and several small concrete-lined and un-lined irrigation canals. The DMC in the Study Area supports limited, if any, aquatic vegetation. Fish species such as striped bass (*Morone saxatilis*) and channel catfish are present in the canal. The DMC embankments support some ruderal vegetation. A small mammal burrow was observed along the embankment near Marshall Road. No evidence of use by burrowing owls was observed during the reconnaissance survey, but this area is potentially suitable habitat for this species. Small concrete canals in the Study Area provide limited habitat for vegetation or wildlife.

No canals would be impacted within the North Valley Regional Recycled Water Program project area.

Alkaline Pool/Swale

An alkaline pool and a swale exist within the alkali flat/scrub community that occurs adjacent to the Study Area on the south side of West Main Avenue. The pool has been disturbed by grazing and supports limited vegetation. The alkali swale is also partially barren, but it supports more vegetation than the pool. Dominant vegetation in the swale consists of iodine bush (*Alenrolfea occidentalis*) and alkali heath (*Frankenia salina*). These wetlands provide potentially suitable habitat for vernal pool branchiopods. While the alkali pool would provide suitable breeding habitat for California tiger salamander (*Ambystoma californiense*), the surrounding landscape

lacks suitable upland habitat for this species.

No alkaline pool/swale habitat would be impacted within the Project Area.

Special Status Species

California tiger salamander, giant garter snake, Conservancy fairy shrimp (*Branchinecta conservatio*), vernal pool fairy shrimp, longhorn fairy shrimp (*Branchinecta longiantenna*), vernal pool tadpole shrimp (*Lepidurus packardii*) and valley elderberry longhorn beetle may be present near the project footprint. Elderberry shrubs, the host plant for the valley elderberry longhorn beetle, were seen near, and may be within 100 feet of project area service roads. Consultation pursuant to section 7(a) of the Endangered Species Act has addressed potential impacts to these species in a separate document.

FUTURE CONDITIONS WITHOUT PROJECT

Under the No Action Alternative, no long-term, sustainable recycled water supply would be available to meet demands within the District or the refuges. The District would continue to rely on the CVP as its primary water supply. To offset reductions in CVP allocations, the District would continue to execute water transfers/exchanges and to pump groundwater from private wells.

In 2014, the CVP allocation to DPWD was 0%, which resulted in the following of over 11,000 acres of prime farm land, economic losses, loss of permanent crops, and placing even greater pressure on groundwater resources. The availability of water for transfers may decline over time, continuing the shortfall, and potentially further increasing pressure on groundwater resources through increased pumping. Groundwater pumping could ultimately lead to overdraft of the basin and other undesired associated effects, including subsidence and water quality degradation.

For the refuges, this new water would be unavailable for wildlife management. Furthermore, Reclamation would continue competing for and purchasing supplemental water for SOD refuges on the open water acquisition/transfer market, which is increasingly becoming unreliable, unsustainable, and costly.

If recycled water is not conveyed, the DMC would continue operations in a fashion similar to existing conditions. Under the No Project Alternative, it is expected that operation of the DMC would continue unchanged.

If recycled water is not provided to DPWD, the Cities of Modesto and Turlock would continue their existing discharges to the San Joaquin River at their present levels. The Cities would not be obligated to discharge future, additional amounts of water to the San Joaquin River. The Cities could pursue other options for disposition of these future, additional amounts of water. If discharge to the river is continued, it is anticipated that both the Modesto and Turlock treatment plants would have to be upgraded in the future to meet increasingly stringent discharge regulations for cold-water fisheries. Even though the City of Modesto is upgrading to Biological

Nitrogen Removal (BNR)/tertiary treatment, future discharge regulations could further increase treatment requirements. The Central Valley Regional Water Quality Control Board (CVRWQCB) has indicated that stricter limitation on discharge to the river will be imposed in the future, which are driven, in part, by requirements for protection of anadromous fish. This could require construction of reverse osmosis or other expensive treatment processes.

The City of Turlock would also likely need to upgrade treatment processes, possibly including new ultraviolet (UV) disinfection and nitrogen removal processes. Its existing facility provides ammonia removal to meet discharge permit requirements; however unlike the Modesto facility, the Turlock facility does not remove nitrates/nitrites from the effluent. Nitrate/nitrite removal could potentially be required in the future for Turlock, as it is for Modesto, which would require construction of new treatment processes similar to Modesto's. In addition, Turlock faces the same potential future restrictions on river discharge, which could require costly treatment processes such as reverse osmosis.

FUTURE CONDITIONS WITH PROJECT

The Project would introduce and convey, on a space available basis, up to 59,000 acre-feet per year (AFY) of recycled water produced by the cities of Modesto and Turlock directly into the Delta-Mendota Canal (DMC), which is owned by Reclamation. The Cities of Turlock and Modesto will need National Pollutant Discharge Elimination System permits (NPDES) to introduce this water into the DMC. The recycled water would then be conveyed directly to DPWD customers or stored within Reclamation's SOD Central Valley Project (CVP) system during low water demand periods. In addition to uses within DPWD's service area, the Proposed Project/Action would provide some water to CVPIA SOD wildlife refuges and wetland areas to help them get closer to reaching their Full Level 4 goal each year.

Plants, wildlife, and fish on the SOD wildlife refuges and wetland areas can be exposed to a variety of contaminants present in recycled water, including Constituents of Emerging Concern (CECs) (e. g. pharmaceuticals, endocrine disruptors, personal care products) and Selenium. Long-term effects of exposure to Constituents of Emerging Concern (CECs) on habitat, wildlife, and fish are unknown.

Terrestrial and Wildlife Resources

Since construction activities such as trenchless construction techniques will be used and the hauling of equipment and supplies will be limited to the access roads, the terrestrial habitat conditions are not expected to change significantly along the construction route, but surface erosion and dust may occur with road activity, which may affect plants and grasses near the project area. A Fugate Contingency Plan will also ensure protection of aquatic resources, special-status plants, and wildlife. Ruderal habitat is present near the staging areas and may be impacted, but this habitat type is common in high disturbance areas and can often re-establish after activities cease. However, wildlife may be present in these ruderal areas and near the spoil piles, and may include birds, small mammals, and reptiles. Total acres of permanent terrestrial impacts have not been provided.

Birds protected under the MBTA may be present in or near the project area, and include species

such as the tricolored blackbird. Reclamation will conduct pre-construction surveys for birds protected under the MBTA if construction activities occur between February 15 and September 1.

Aquatic Resources

Seasonal wetland habitat is present near the Project study area, but Reclamation has not yet provided delineations. Aquatic habitats on the SOD Refuges may be affected by the Constituents of Emerging Concern (CECs) which may be found in this water. The reduction in San Joaquin River flow could contribute to a reduction in juvenile Chinook salmon survival during spring out migration, a reduction in adult salmon escapement to the San Joaquin River tributaries, and a reduction in habitat quality and availability in the lower river and estuary (Hanson 2013).

SERVICE MITIGATION POLICY

The recommendations provided herein for the protection of fish and wildlife resources are in accordance with the Service's Mitigation Policy as published in the Federal Register (46:15; January 23, 1981).

The Mitigation Policy provides Service personnel with guidance in making recommendations to protect or conserve fish and wildlife resources. The policy helps ensure consistent and effective Service recommendations, while allowing agencies and developers to anticipate Service recommendations and plan early for mitigation needs. The intent of the policy is to ensure protection and conservation of the most important and valuable fish and wildlife resources, while allowing reasonable and balanced use of the Nation's natural resources.

Under the Mitigation Policy, resources are assigned to one of four distinct Resource Categories, each having a mitigation planning goal which is consistent with the fish and wildlife values involved. The Resource Categories cover a range of habitat values from those considered to be unique and irreplaceable to those believed to be much more common and of relatively lesser value to fish and wildlife. The Mitigation Policy does not apply to threatened and endangered species, Service recommendations for completed Federal projects or projects permitted or licensed prior to enactment of Service authorities, or Service recommendations related to the enhancement of fish and wildlife resources.

In applying the Mitigation Policy during an impact assessment, the Service first identifies each specific habitat or cover-type that may be impacted by the project. Evaluation species which utilize each habitat or cover-type are then selected for Resource Category analysis. Selection of evaluation species can be based on several rationales, as follows: (1) species known to be sensitive to specific land- and water-use actions; (2) species that play a key role in nutrient cycling or energy flow; (3) species that utilize a common environmental resource; or (4) species that are associated with Important Resource Problems, such as anadromous fish and migratory birds, as designated by the Director or Regional Directors of the Fish and Wildlife Service. (Note: Evaluation species used for Resource Category determinations may or may not be the same evaluation species used in a Habitat Evaluation Procedures (HEP) application, if one is conducted). Based on the relative importance of each specific habitat to its selected evaluation

species, and the habitat's relative abundance, the appropriate Resource Category and associated mitigation planning goal are determined.

Mitigation planning goals range from "no loss of existing habitat value" (i.e.: Resource Category 1) to "minimize loss of habitat value" (i.e.: Resource Category 4) (Table 4). The planning goal of Resource Category 2 is "no net loss of in-kind habitat value;" to achieve this goal, any unavoidable losses would need to be replaced in-kind. "In-kind replacement" means providing or managing substitute resources to replace the habitat value of the resources lost, where such substitute resources are physically and biologically the same or closely approximate those lost.

Table 4. Summary of Resource Categories, Designation Criteria and Mitigation Planning Goals under the Service Mitigation Policy

Resource category	Designation Criteria	Mitigation Planning Goal
1	High value for evaluation species and unique and irreplaceable	No loss of existing habitat
2	High value for evaluation species and scarce or becoming scarce	No net loss of in-kind habitat value
3	High to medium value for evaluation species and abundant	No net loss of habitat value while minimizing loss of in-kind habitat value
4	Medium to low value for evaluation species	Minimize loss of habitat value

In addition to mitigation planning goals based on habitat values, the U.S. Fish and Wildlife Service's Pacific Southwest Region, which includes California, has a mitigation planning goal of no net loss of acreage and value for wetland habitat. This goal is applied in all impact analyses.

In recommending mitigation for adverse impacts to any of these habitats, the Service uses the same sequential mitigation steps recommended in the Council on Environmental Quality's regulations. These mitigation steps (in order of preference) are: avoidance, minimization, rectification, reduction or elimination of impacts over time, and compensation.

Nine fish and/or wildlife habitats were identified in the project study area which had potential for impacts from the Project. These habitats, and their corresponding evaluation species, designated Resource Categories and associated mitigation planning goals are discussed below, and summarized in Table 5.

Table 5. Resource Categories, Evaluation Species, and Mitigation Planning Goal for the Habitats Impacted by the North Valley Regional Recycled Water Program

Cover-Type	Evaluation Species	Resource Category	Mitigation Goal
Agricultural lands	Northern harrier Swainson's hawk	4	Minimize loss of habitat value
Ruderal	Red-winged blackbird	4	Minimize loss of habitat value
Valley Oak Riparian Forest	Yellow warbler Great homed owl	2	No net loss of in-kind habitat value
Willow Riparian Woodland	Yellow warbler Great homed owl	2	No net loss of in-kind habitat value
Alkali Scrub/Alkali Flat	San Joaquin kit fox	2	No net loss of in-kind habitat value
Riverine	Fall-run Chinook salmon Western pond turtle	2	No net loss of in-kind habitat value
Sloughs and Natural Drainages	Great blue heron	2	No net loss of in-kind habitat value
Constructed or Modified Drainages/ Canals	marsh wren	4	Minimize loss of habitat value
Alkaline Pool/Swale	California tiger salamander	2	No net loss of in-kind habitat value

Agricultural Lands

Even though upland agriculture is disturbed regularly by discing, mowing, and application of herbicide and/or pesticides, it can still provide value for native and non-native species. Upland agriculture can provide habitat for species common to the Central Valley of California such as ring-necked pheasant (*Phasianus colchicus*), red-tailed hawk, Swainson's hawk, California ground squirrel, and California vole. The agriculture cover-type within the project area consists of irrigated pastures, orchards, and row crops. The evaluation species for this cover-type includes northern harrier and Swainson's hawk. We chose the northern harrier and Swainson's hawk as evaluation species because: (1) raptors, as predators, play a key role in community ecology of the study area; (2) they have important human non-consumptive benefits (e.g. bird watching); and (3) the Service has responsibility for the protection and management of these species under MBTA. Agricultural fields provide foraging areas for raptors. This cover-type in the project area is assumed to be low to moderate quality and value. The Service designates the agricultural habitat type as Resource Category 4. Our associated mitigation planning goal is "minimize loss of habitat value."

Ruderal

The evaluation species selected for ruderal habitat in the project study area is the red-winged blackbird. We chose the red-winged blackbird as an evaluation species because: (1) it has important human non-consumptive benefits (e.g. bird watching); (2) and the Service has responsibility for the protection and management of this species under MBTA. Ruderal herbaceous habitat in the project study area has been designated Resource Category 4, based on the marginal habitat it provides to native species, and the high degree of nonnative plant species it contains.

Riparian Woodland

The evaluation species selected for riparian habitat that would be impacted by this Project are the yellow warbler and great horned owl. The yellow warbler and great horned owl were selected because: (1) they have important human non-consumptive benefits (e.g. bird watching); and (2) the Service has responsibility for the protection and management of these species under MBTA. Therefore, the Service designates the riparian woodland habitat within the Project area as Resource Category 2. Our associated mitigation planning goal for these areas is "no net loss of in-kind habitat value."

Alkali Scrub/Alkali Flat

The evaluation species selected for alkali scrub/alkali flat habitat that would be impacted by this Project is the San Joaquin kit fox. The San Joaquin kit fox was selected because: (1) of its importance in alkali scrub/alkali flat systems within the Central Valley of California; and (2) the Service has responsibility for the protection and management of this species under the Endangered Species Act (ESA). Therefore, the Service designates the alkali scrub/ alkali flat habitat within the Project area as Resource Category 2. Our associated mitigation planning goal for these areas is "no net loss of in-kind habitat value."

Riverine

The evaluation species selected for riverine cover-type that would be impacted in the extended study area are fall-run Chinook salmon and western pond turtle. Fall-run Chinook salmon was selected because of its reliance on riverine habitat and it is an appropriate surrogate for the target spring-run Chinook salmon that are the focus of the San Joaquin River Restoration Program (SJRRP). The western pond turtle was selected due to its dependence on stream and wetland habitat throughout the project area. Because of the high value of this habitat to many sensitive wildlife species, the Service designates the riverine cover-type within the Project area as Resource Category 2. Our associated mitigation planning goal for these areas is "no net loss of in-kind habitat value."

Sloughs and Natural Drainages

The evaluation species selected for sloughs and natural drains in the project study area is the great blue heron. We chose the great blue heron as an evaluation species because: (1) it has important human non-consumptive benefits (e.g. bird watching); (2) and the Service has responsibility for the protection and management of this species under MBTA. Because of the high value of this habitat to many sensitive wildlife species, the Service designates the riverine cover-type within the Project area as Resource Category 2. Our associated mitigation planning goal for these areas is "no net loss of in-kind habitat value."

Constructed or Modified Drainages/ Canals

The evaluation species selected for constructed or modified drainages/ canals in the project study area is the marsh wren. We chose the marsh wren as an evaluation species

because: (1) it has important human non-consumptive benefits (e.g. bird watching); (2) and the Service has responsibility for the protection and management of this species under MBTA. Constructed or modified drainages/canals habitat in the project study area has been designated Resource Category 4, based on the marginal habitat it provides to native species, and the high degree of nonnative plant species it contains.

Alkaline Pool/Swale

The evaluation species selected for alkaline pool/swale in the project study area is the California tiger salamander. We chose the California tiger salamander as an evaluation species because: (1) of its importance in alkali pool/swale systems within the Central Valley of California; (2) and the Service has responsibility for the protection and management of this species under the ESA. Because of the high value of this habitat to many sensitive wildlife species, the Service designates the alkaline pool/swale habitat within the Project area as Resource Category 2. Our associated mitigation planning goal for these areas is "no net loss of in-kind habitat value."

Table 6. A range of compensation ratios for potential impacts to habitats from the NVRRWP, for planning purposes.

Habitat Types	Compensation Ratios (acres) CALFED
Riparian Forest/Scrub	2:1 to 5:1
Woodland/Savanna	2:1 to 5:1
Emergent Marsh	2:1 to 5:1
Seasonal Wetland and Vernal Pool	2:1 to 5:1
Annual Grassland	1:1 to 3:1
Agriculture/Orchard	1:1 to 3:1

(CALFED 2000)

On Dec 9, 2015, the Service received an email containing the document titled Comments of FWCAR Report.docx from Reclamation. This document stated that the applicant is committed to avoiding impacts to Resource Category 2 habitat types and all Resource Category 4 habitat types that are disturbed during construction will be restored to their preexisting condition through post-construction restoration.

RECOMMENDATIONS

The proposed North Valley Regional Recycled Water Program could have effects on fish and wildlife and their habitat. If Reclamation proceeds with the project as described, the Service recommends:

- A compensatory mitigation ratio of 1:1 is recommended for the Resource Category 4 habitats disturbed during construction.
- Funds for provision of Level 4 (L4) water to refuges should only be used on this project if delivery of water to refuges is guaranteed, if the water that is made available

approximates the preferred monthly needs of the SOD refuges, and the amount of water delivered is commensurate with the percentage paid into this project. CVPIA called for providing two types of refuge water supply: Level 2 (L2), which was to derive primarily from CVP yield, and Incremental L4 which was to be acquired and was an additional amount above L2. Full L4 is the total annual amount of water identified for each refuge in CVPIA as required for optimum wetland and wildlife habitat development and management. Section 3406 (d) of the CVPIA mandated that full L4 refuge water supply needs would be met by 2002

(<http://www.usbr.gov/mp/cvpia/3406d/3406d.html#3406d>). Full L4 water has not been met. The full L4 water delivery target for the San Joaquin Basin Refuges is 180,000 AF and is satisfied when both L2 and L4 water targets are met in full.

- The site specific water quality objective for the Wetland Water Supply Channels in the Grasslands Ecological Area is 2 µg/L Selenium. Water delivered to the SOD Refuges should meet this standard (Reclamation et al. 2001).
- Methylmercury (MeHg) is of high concern for SOD Refuge managers. MeHg levels should be monitored and efforts should be made to reduce them. Statewide MeHg objectives should be followed as soon as they are developed.
- Provide a long-term monitoring plan for Constituents of Emerging Concern (CECs). The State Water Resources Control Board recommended the monitoring of CECs in their *Policy for Water Quality Control for Recycled Water* (Recycled Water Policy), Revised January 22, 2013.
- Minimize impacts to riparian habitat that is temporarily disturbed during construction by reseeding with native grasses and forbs after the construction is complete.
- Implement an Erosion Control Plan and Stormwater Prevention Plan that minimizes erosion and sedimentation during construction by using erosion control devices, such as straw wattles.
- Survey the construction sites for ground nesting birds and if nests with eggs are found, it is recommended that either: (1) construction is delayed until nesting season is completed, or (2) eggs are removed from the nest and placed in a facility for incubation.
- Work towards making the proposed project carbon neutral. Consistent with the Intergovernmental Panel on Climate Change (IPCC) (2007) adaptation strategies/mitigation recommendations, the Service recommends compensating for the proposed project's carbon footprint by purchasing carbon offsets. Alternatively, carbon offsets could be achieved through sequestering carbon (converting tilled agricultural fields near the project area to native grasslands).
- Implement a Hazardous Materials Control and Spill Prevention and Response Plan to

avoid the release of hazardous materials to the environment.

- Implement the conservation measures listed in the EIS/R for the Project.
- Maintain continuance of the collaborative approach to the planning and implementation of this Project with the Service.

If you have any questions regarding this report, please contact Andrew Raabe at (916) 978-5463.

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