

KNIGHTS LANDING OUTFALL GATES PROJECT FINAL ENVIRONMENTAL ASSESSMENT

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Acronyms and Abbreviations

2012 Plan	Northern Sacramento Valley Planning Area 2012 Triennial Air Quality Attainment Plan
AB	Assembly Bill
ARB	California Air Resources Board
B.P.	before present
Basin Plan	Water Quality Control Plan for the Sacramento River and San Joaquin River Basins
Basin Plans	Water Quality Control Plans
BMPs	Best Management Practices
CAA	federal Clean Air Act
CAAQS	California ambient air quality standards
California CAA	California Clean Air Act
CAP	climate action plan
CBD	Colusa Basin Drain
CCR	California Code of Regulations
CDFW	California Department of Fish and Wildlife
CDP	census-designated place
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFGC	California Fish and Game Code
CFR	Code of Federal Regulations
CH ₄	methane
CHRIS	California Historical Resources Information System
CHSC	California Health and Safety Code
CNDDB	California Natural Diversity Database
CNEL	Community noise equivalent level
CNPPA	California Native Plant Protection Act
CNPS	California Native Plant Society's
CO	carbon monoxide
CO ₂	carbon dioxide
CRHR	California Register of Historical Resources
CVFPB	California Central Valley Flood Protection Board
CVFPP	Central Valley Flood Protection Plan
CWA	Clean Water Act
dB	Decibel
dBA	A-Weighted Decibel
dbh	diameter at breast height
DPM	diesel particulate matter
DTSC	Department of Toxic Substances Control
DWR	California Department of Water Resources

EFH	essential fish habitat
EPA	U.S. Environmental Protection Agency
ESA	Federal Endangered Species Act
FEMA	Federal Emergency Management Agency
GHG	greenhouse gas
GWP	global warming potential
HCP	habitat conservation plan
HFC	hydrofluorocarbons
IPCC	Intergovernmental Panel on Climate Change
JPA	Yolo County Habitat Conservation Joint Powers Agency
KLOG	Knights Landing Outfall Gates
L _{dn}	Day-Night Level
L _{eq}	Equivalent Sound Level
L _{max}	Maximum Sound Levels
LOS	level of service
L _{xx}	Percentile-Exceeded Sound Level
MBTA	Migratory Bird Treaty Act
mg/L	milligrams per liter
Mitigation Agreement	Agreement Regarding Mitigation for Impacts to Swainson's Hawk Foraging Habitat in Yolo County
MLD	Most Likely Descendant
N ₂ O	nitrous oxide
NAAQS	national ambient air quality standards
NAHC	Native American Heritage Commission
NCCP	Natural Community Conservation Plan
NEPA	National Environmental Policy Act
NFIP	National Flood Insurance Program
NMFS	National Marine Fisheries Service's
NO ₂	nitrogen dioxide
NOAA	National Oceanic and Atmospheric Administration
NO _x	nitrogen oxides
NRHP	National Register of Historic Places
NTU	Nephelometric Turbidity Unit
OHWM	ordinary high water mark

PFCs	perfluorinated carbons
PM	particulate matter
PM10	PM less than or equal to 10 microns in diameter
PM2.5	PM less than or equal to 2.5 microns in diameter
ppm	parts per million
PRC	Public Resources Code
RD 108	Reclamation District 108
Regional Water Board	Central Valley Regional Water Quality Control Board
ROG	reactive organic gases
SF ₆	sulfur hexafluoride
SFNA	Sacramento Federal Nonattainment Area
SHPO	State Historic Preservation Officer
SO ₂	sulfur dioxide
SPCCP	spill prevention, control, and counter-measure plan
SR	State Route
SRBPP	Sacramento River Bank Protection Project
SRFCP	Sacramento River Flood Control Project
Superfund	Comprehensive Environmental Response, Compensation, and Liability Act
SVAB	Sacramento Valley Air Basin
TDS	Total dissolved solids
TMDL	total maximum daily load
USACE	U.S. Army Corps of Engineers
USC	U.S. Code
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
YCCL	Yolo County Central Landfill
YSAQMD	Yolo-Solano Air Quality Management District

1.1 Purpose of the Requestor's Preferred Alternative

Reclamation District 108 (RD 108) is proposing to construct a positive fish barrier on the downstream side of the existing Knights Landing Outfall Gates (KLOG) in the Colusa Basin Drain (CBD). This action would be the Requester's Preferred Alternative (hereafter referred to as the "proposed action"), and would also involve the placement of a small amount of riprap on the right bank of the CBD immediately downstream of the KLOG. Currently, adult salmon may be able to enter the CBD through the KLOG when certain flow velocities are met that attract migrating salmon. Once salmon enter the CBD, there is no upstream route for salmon to return to the Sacramento River, and the fish perish and are lost from production. Construction of the barrier on the downstream side of the KLOG would prevent salmon entry into the CBD while maintaining outflows. The proposed action would also address an existing erosion site on the right bank of the channel, immediately downstream of the KLOG structure. The erosion site has formed as a result of water eddying after it passes through the gates, which has scoured the soil out from between the KLOG foundation and the right bank. The proposed action would include repairs to the site that would prevent erosion of the structure foundation and further erosion of the bank, which is part of the Federal flood management project.

RD 108 constructed the original KLOG structure, works in coordination with other local districts to serve as the local maintaining agency for the adjacent levees, and delivers water to its members, of which a portion of that water is diverted from the CBD. As such, RD 108 has a direct interest in the conservation of natural resources associated with the CBD and the KLOG, and has initiated the proposed action in order to protect listed fish species while preserving the functionality of the KLOG and adjacent levees. To implement the proposed action, RD 108 is requesting approval from the Central Valley Flood Protection Board (CVFPB) to implement the proposed action. As part of its approval process, the CVFPB will request a determination from the U.S. Army Corps of Engineers (USACE) pursuant to Section 14 of the Rivers and Harbors Act of 1899 (Title 33 of the United States Code [USC], Section 408, [33 USC 408]), hereinafter referred to as Section 408, for the alteration or occupation or use of the Federal flood management project. USACE's authority to grant permission for the proposed action under Section 408, and the authority of the U.S. Bureau of Reclamation (USBR) funding the proposed action, triggers the requirement for USACE and USBR to comply with the National Environmental Policy Act (NEPA). This environmental assessment (EA) has been prepared to fully assess the effects of constructing and operating the proposed action (also referred to as "action"), as required under NEPA. USACE authorization consists of approval from the Chief of Engineers, or his designee, for alterations to certain public works as described in 33 USC Section 408. USBR will serve as a "cooperating agency" under NEPA and rely on the EA for its discretionary approval of funding the proposed action.

1.2 Need for and Objectives of the Proposed Action

Adult anadromous fish migrating to spawning grounds face several hazards, and it is essential to minimize these hazards. Protecting the upstream migrating adult fish is critical as salmonids in the reproductive phase are the fewest in number among all life stages, and significant changes in the populations of adult salmon can have resulting effects on subsequent generations. Adult salmon may be able to enter the CBD through the KLOG and are subsequently lost from production as there is no upstream connection to the Sacramento River and upstream spawning grounds. A barrier to CBD entry is needed, therefore, to protect the lifecycle of special-status fish in the Sacramento River.

In addition, repair of the erosion site is needed to prevent further erosion and eventual encroachment into the adjacent Federal levee.

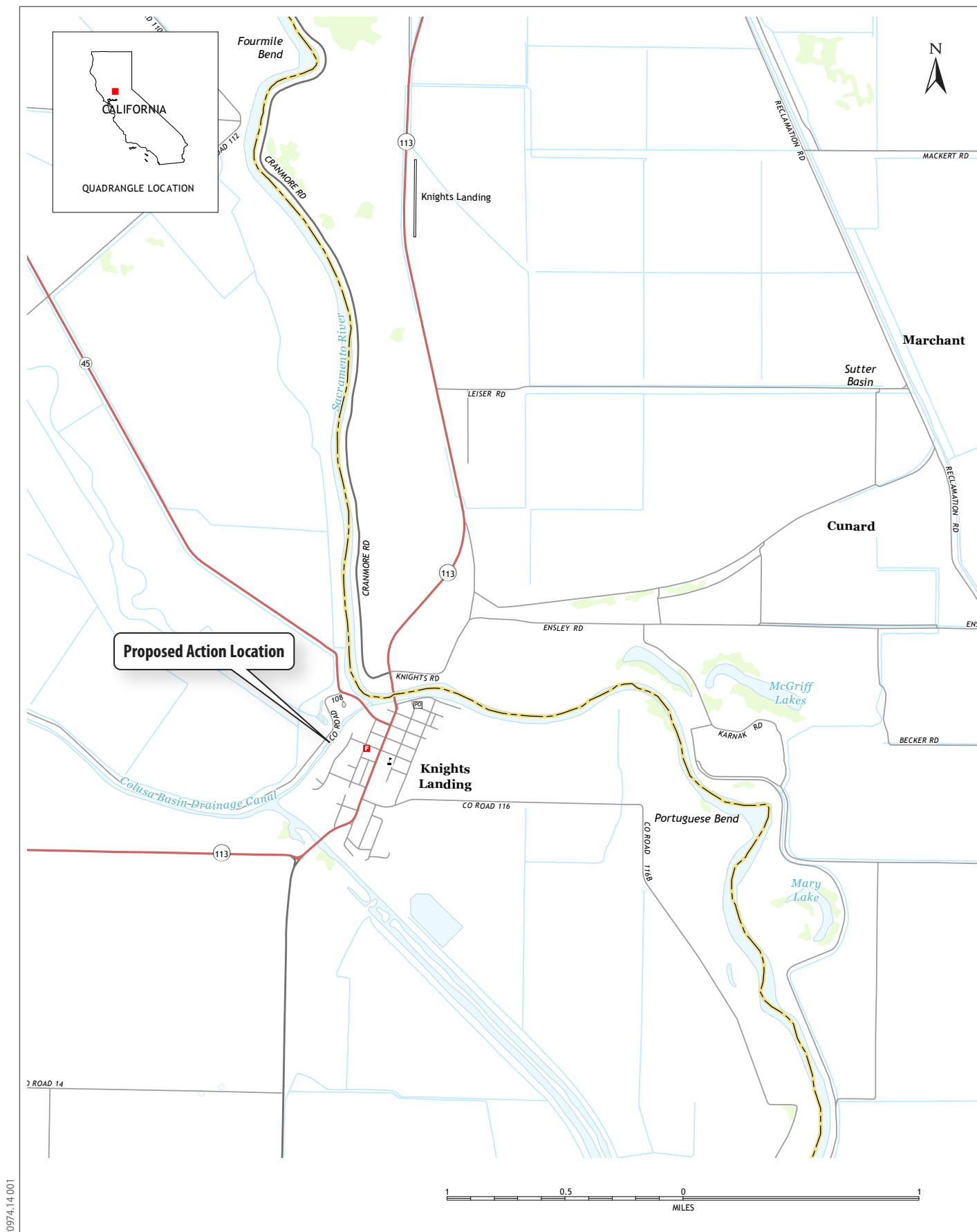
The proposed action is intended to meet the following objectives.

- Prevent adult salmon from entering the CBD through the KLOG while maintaining outflows through the gates on the structure.
- Construct a low-maintenance barrier that can be raised and lowered to match changing water surface elevations and maintain appropriate freeboard.
- Complete construction as soon as possible to take advantage of low flows in the CBD and the Sacramento River.
- Implement an action without exceeding available funding.
- Repair erosion damage on a Federal levee while preventing further erosion.
- Implement an action that is environmentally acceptable.

1.3 Action Area and Setting

The KLOG is located on the CBD, approximately one-quarter mile from its confluence with the Sacramento River near the community of Knights Landing, just below River Mile 90, in Yolo County (Figure 1-1). The CBD in the action area is approximately 100 feet wide, at low water, and drains in a northeasterly direction, and the banks on each side of the KLOG are Sacramento River Flood Control Project (SRFCP) levees (Flood Control Act of 1 March 1917, Public 367-64th Congress). The CBD collects all drainage from the Colusa Basin watershed, which spans areas of Glenn and Yolo Counties. The watershed extends from the Stony Creek watershed in the north to the Cache Creek watershed to the south, and from the Sacramento River in the east to the foothills of the inner Coast Ranges to the west, and covers over one million acres (Colusa County Resources Conservation District 2012). In addition to providing drainage for the Colusa Basin, the KLOG structure also serves to maintain CBD water elevations for irrigation use in the surrounding agricultural lands. A section of Knights Landing that is designated as a low density residential area is located immediately on the landside of the right bank levee, and land designated for agricultural use is located on the landside of the left bank levee. The CBD at the site of the proposed action is a non-navigable waterway, as there are wooden piles that prevent access approximately 700 feet downstream of the KLOG.

The KLOG structure is managed by the California Department of Water Resources (DWR). The structure was originally constructed by local interests in the early twentieth century but has been modified twice since then. The existing structure has an 84-foot-wide concrete slab apron with a 6-



foot-high wing wall on each side. The structure has a concrete buttress with eight 66-inch and two 42-inch screw-operated slide gates on the Colusa Drain side, and eight 66-inch and two 42-inch combination flap and slide gates on the Sacramento River side. The purpose of the KLOG structure is to protect the lower Colusa Basin from backwater flooding from the Sacramento River and to control water levels in the CBD for irrigation and drainage purposes. Flow calculations at the KLOG are based on flow conditions caused by the gate and flap gate settings of each gate relative to the head difference of the stage of the gage on the CBD upstream of the gates and that of the Sacramento River at Knights Landing gage downstream of the gates.

In 2012, DWR rehabilitated the KLOG structure to replace all gate flaps, seals, and assemblies. Additionally, among other new features, outdated motor controllers and nonfunctional water level sensors were replaced. The new control system provides greater flexibility in the operation of the gates to protect CBD from the backwater effect of the Sacramento River and maintain the necessary water pool elevation on the CBD side for irrigation. During the 1970s, the California Department of Fish and Game (now California Department of Fish and Wildlife [CDFW]), constructed an electric barrier to prevent salmon entry at KLOG. However, the electric barrier was damaged and never repaired or replaced, and no physical or behavioral fish barrier has been installed since.

1.4 Background of Proposed Action

Historically, adult salmon have been able to enter the CBD through the KLOG structure. The proposed action focuses on the migration through the KLOG under certain flow conditions. Once migrating salmon enter the CBD through the KLOG, there is no upstream route for salmon to return to the Sacramento River. The flow conditions that allow adult salmon entry into the CBD at the KLOG may occur when water velocity is sufficient to attract the fish but low enough for the fish to overcome when migrating upstream. Factors affecting the ability of salmon to pass through the KLOG include CBD outflow and stage, gate openings, and Sacramento River stage. The proposed action would allow flows to pass downstream through the KLOG while preventing adult salmon from passing upstream.

Experience at the Red Bluff Diversion Dam and the Tehama-Colusa Fish Facilities has shown that adult salmon readily swim through flows from hydraulic control structures when the hydraulic head differential between the upstream and downstream water bodies is less than about 4 feet (Vogel et al. 1988; U.S. Fish and Wildlife Service 1990). During most periods of the year, adult salmon cannot pass through the KLOG, primarily due to very high water velocities through the gates when the head exceeds 4 feet. Probable conditions for fish passage through the KLOG occur when the differential between the water surface elevations in the CBD and the Sacramento River is less than 4 feet (with upstream elevations as the higher elevation), one or more gates are open at least 1 foot, and the KLOG gate orifices are submerged at least 1 foot from backwater influence of the Sacramento River.

1.5 Regulatory Compliance

In implementing the proposed action, RD 108 would seek all necessary permissions, authorizations, concurrences, and permits to comply with the following regulatory schemes, as relevant.

- California Environmental Quality Act (CEQA)

- Rivers and Harbors Appropriation Act
- Clean Water Act (CWA)
- California Code of Regulations (CCR)
- California Fish and Game Code (CFGF)
- National Historic Preservation Act (NHPA)
- Federal Endangered Species Act (ESA)
- California Endangered Species Act (CESA)
- Porter-Cologne Water Quality Control Act
- Federal Clean Air Act (CAA)
- California Clean Air Act (California CAA)

2.1 Introduction

This chapter describes the proposed action and other design alternatives that were developed to achieve the proposed actions' purpose and need while avoiding or minimizing environmental effects. The alternatives that were evaluated include picket weirs, an in-channel block net, an electric barrier, and a sound and bubble guidance device. This chapter also discusses the alternative screening process.

The picket weirs have been selected as the proposed action. Chapter 3 of this EA includes an in-depth analysis of the effects of the proposed action and the No Action Alternative. A detailed description of these alternatives follows the alternative screening discussion.

2.2 Alternatives Screening

RD 108 considered four alternatives that would be barriers to upstream passage through the KLOG gates at the construction site, described below.

- **Alternative 1: Picket Weirs**

Picket weirs are a permanent, passive barrier that would be constructed on the concrete apron located on the downstream side of the KLOG structure. The pickets would be a physical barrier that would prevent passage through the KLOG structure while maintaining downstream flows through the gates. The pickets would be operated remotely using an actuator motor and would be programmed to rise and fall with changing water surface elevations.

- **Alternative 2: In-Channel Block Net**

A net would be extended across the CBD on the downstream side of the KLOG. The net would have a weighted bottom or would be anchored to the substrate to keep it in place. An oversized net with a floating top line would be able to prevent fish passage at a wide range of water surface elevations.

- **Alternative 3: Electric Barrier**

The electric barrier would be set up downstream of the KLOG structure and would consist of electrical cables deployed in a concrete sill set up across the channel bottom and banks to the maximum river elevation. The barrier would create an electrical field which would deter fish from moving closer to the KLOG structure.

- **Alternative 4: Sound and Bubble Guidance Device**

The sound and bubble guidance device involves installation of a temporary but continuous frame across the bottom of the entire channel downstream of the KLOG structure. The frame houses cables and pipes filled with pressurized air, and bubbles are emitted from pipes attached to the frame. Strobe lights and sound projectors would be attached to the frame and, when combined with the bubbles, creates a behavioral deterrent for fish.

RD 108 established and applied six criteria to qualitatively evaluate the alternatives and eliminate those alternatives that did not adequately meet the following criteria.

- **Meet the Objectives of the Proposed Action Regarding Access through the KLOG Structure**—The objective of the proposed action is to prevent adult salmonid passage through the KLOG structure. Alternatives that provide the greatest reliability and effectiveness in preventing fish passage are the most favored.
- **Construction Cost**—Due to the relatively small amount of funds available from RD 108 for construction, funds must be spent prudently to enable the barrier to be constructed. Alternatives with lower construction and implementation costs are favored.
- **Ability to Allow Downstream Passage for Fish**—Several species of fish, including special-status fish, are found in the CBD upstream of the KLOG structure. The alternatives that would allow fish to pass downstream through the KLOG to the Sacramento River while the barrier is operating are favored.
- **Barrier Permanence**—The permanence of the proposed action refers to the construction of a barrier that would remain in place year-round without having to be redeployed each season it is used, which would reduce operational costs. Alternatives that require repeated deployment and removal would likely have a greater risk of affecting special-status species and would have more frequent habitat disturbance. Barriers that can remain in place year-round would be most favored.
- **Effort of Maintenance**—The preferred alternative would allow DWR to operate the barrier remotely and would have minimal maintenance requirements. Frequent maintenance would create a cost burden. Level of maintenance would also include how easily the barrier may be damaged by debris, which would likely require more frequent repair. Alternatives with less maintenance requirements would be most favored.
- **Recreation Compatibility**—The area downstream of the KLOG is used for several recreational uses, including swimming and fishing. The alternatives with the least interference with recreational uses would be most favored.

In some cases, an alternative may partially meet a criterion while another meets it more fully. For this reason, the designations of more favorable (MF) and less favorable (LF) were applied to each criterion for each alternative. Table 2-1 provides the results of the criteria evaluation.

Table 2-1. Evaluation of Alternatives

Evaluation Criteria	Alternative 1 (Picket Weirs)	Alternative 2 (In-Channel Block Net)	Alternative 3 (Electric Barrier)	Alternative 4 (Guidance Device)
Meet the Proposed Action's Objectives	MF	MF	LF	LF
Construction Cost	LF	MF	LF	LF
Downstream Passage	MF	LF	LF	LF
Barrier Permanence	MF	LF	MF	LF
Effort of Maintenance	MF	LF	MF	LF
Recreation Compatibility	MF	LF	LF	MF

The least favorable alternatives are Alternatives 2, 3, and 4.

Alternative 2 would require the installation of a net across the CBD, with weights or anchors at the bottom of the net to keep it in place, and a floating top line to block fish passage at varying water surface elevations. The net would meet the proposed action's objective of preventing fish passage and would be the least costly to build. However, the net would prevent downstream passage by fish from the CBD to the Sacramento River. The net would need to be deployed and removed seasonally and would require extensive maintenance to clear the debris it would accumulate and that would possibly cause damage to the net, somewhat offsetting the low cost of installation with higher operation and maintenance costs. In addition, debris catching in the net could create holes large enough for fish passage. The net would also be potentially hazardous to fishermen or swimmers. Based on the inability to meet most of the evaluation criteria, RD 108 determined that Alternative 2 was not a reasonable alternative to carry forward for detailed analysis.

Alternative 3 involves the construction of a concrete sill across the CBD, with electric cables deployed periodically to deter fish by electrifying the water around the barrier. Alternative 3 would provide a permanent barrier that would have permanent installation and minimal maintenance costs. However, its effectiveness is uncertain and is, therefore, less favored for meeting the proposed action's objectives. The electrifying of the water would also be potentially hazardous to swimmers and fishermen, and would prevent fish from reaching the Sacramento River from the upstream side of the CBD, as it would block fish in both directions. Construction of the electric barrier would also be relatively expensive. Given the conflict with recreation, downstream passage, and its unknown reliability, RD 108 determined that Alternative 3 was not a reasonable alternative to carry forward for detailed analysis.

Alternative 4 is a guidance device that uses bubbles, sound, and strobe lights to deter fish from passing the barrier. While Alternative 4 would be compatible with recreational uses in the area, it is less favorable in all other evaluation criteria. Similar to the electric barrier, the effectiveness of the guidance device is uncertain. The guidance device, if effective, would also inhibit fish movement in both directions, thereby not allowing downstream passage for fish attempting to exit the CBD. Also, the device would be expensive to build, install, and operate. Further, the device would have greater potential for damage from debris, such as logs, which would increase maintenance efforts, and the device would have to be installed and removed each season. The only favorable criterion evaluation was its compatibility with recreation (Table 2-1); therefore, RD 108 determined that Alternative 4 was not a reasonable alternative to carry forward for detailed analysis.

The most favorable alternative is Alternative 1, which involves the construction of picket weirs directly downstream of the KLOG structure. While it would be unfavorable from a construction cost standpoint, it would have the highest reliability when it comes to meeting the proposed action's objectives and would allow fish upstream of the KLOG to pass downstream and out of the CBD, unlike the other three alternatives. The barrier would be permanent and would not incur additional costs from redeployment each season, which would reduce potential effects on special-status species in the area. The picket weirs would also be low maintenance, as they would be controlled remotely; could be adjusted temporarily to allow accumulated debris to pass over the top of the pickets; and would not be prone to damage. The weirs would also not interfere with local recreation.

After application and consideration of all the selection criteria, Alternative 1, the picket weirs, is the proposed action as it most favorably meets the criteria. This alternative was carried forward for detailed environmental analysis, compared to the No Action Alternative.

2.3 Alternatives Evaluated in Detail

2.3.1 No Action

The No Action Alternative represents conditions that “would be reasonably expected to occur in the foreseeable future if the proposed action were not approved based on current plans and consistent with available infrastructure and community services.” The No Action Alternative would consist of continuation of current conditions and assumes no fish barrier would be implemented to prevent adult salmonid passage. If RD 108 were not to implement the proposed action, there would still be potential for adult salmon to be lost without reproducing upstream of the KLOG structure.

2.3.2 Proposed Action

This section includes a discussion of features, construction methods and activities, site access and staging, equipment and personnel, schedule, and operation and maintenance for the proposed action. The construction area includes the area in which the barrier would be constructed, the erosion site repairs, staging areas, and site access (Figure 2-1).

2.3.2.1 Features

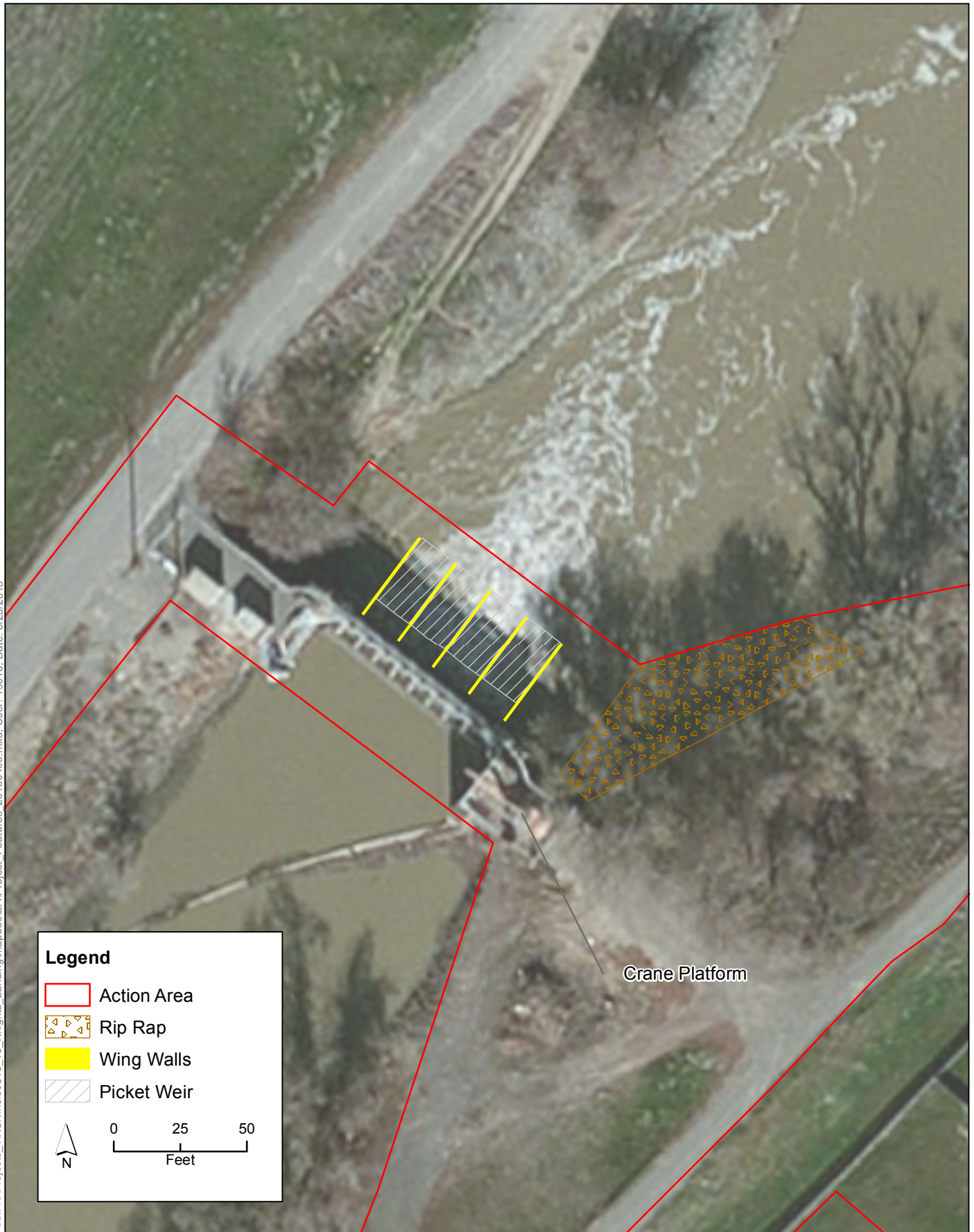
The proposed action consists of the construction of new concrete wing walls, installation of a metal picket weir, installation of rock slope protection, and the removal of vegetation for construction access purposes (Figure 2-2). All features would be constructed on the downstream side of the KLOG structure. The concrete wing walls and metal picket weir would be constructed on the existing concrete apron, and the metal picket weir would be designed to prevent salmon from entering into the gates at the KLOG. All riprap would be placed on the natural substrate of the right bank of the CBD.

2.3.2.2 Construction Methods and Activities

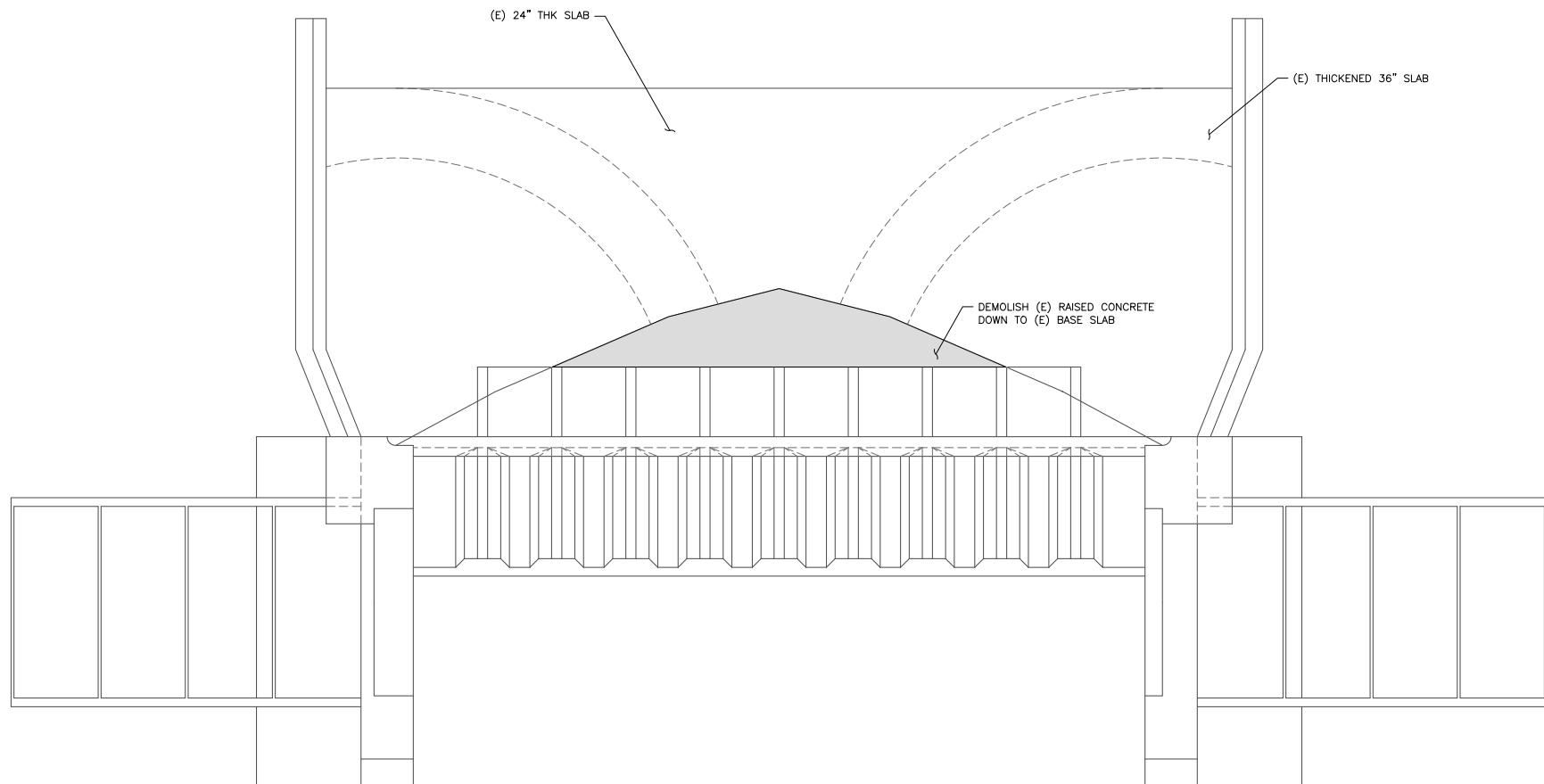
Mobilization

The contractor would notify the adjacent property owners at least 30 days in advance of construction activities. Chain-link fencing would be set up to establish the limits of construction to the extent feasible. Site access, staging areas, and environmental controls, as described in Section 2.3.2.3, *Site Access and Staging*, and Section 2.3.3, *Environmental Commitments*, would be installed. In order to dewater the concrete apron, all gates on the structure would be closed, and a temporary water barrier would be installed on the downstream edge of the concrete apron, between the existing outer wing walls shown in Figure 2-3, in order to dewater the construction site. Any remaining water would be pumped downstream out of the construction site. Only the existing concrete apron would be dewatered, and not the erosion site where riprap would be placed. All gates on the KLOG structure would be closed during construction to help keep the site dewatered, and water in the CBD would flow into the Knights Landing Ridge Cut, which is approximately 2,000 feet upstream of the construction site. Signage notifying the public of construction activities and temporary pedestrian access closure would be displayed on the landside of both levees. Road 108, which runs along the top of the left bank levee, would be closed between State Route (SR) 45 and Road 112 during construction.





**Figure 2-2
Construction Features**



DEMOLITION PLAN
SCALE: $\frac{1}{8}"=1'-0"$

P0974.14.001

Source: VE Solutions, Inc.



Figure 2-3
Demolition Plan

Erosion Repair

Prior to the construction of the new wing walls and picket weirs, an existing erosion site immediately downstream of the KLOG on the right bank of the channel and adjacent to the concrete apron would be repaired (Figure 2-2). The erosion site is approximately 100 feet long, extends approximately 30 feet up the bank from the levee toe, and has started to undercut the right bank. The erosion site is bare of vegetation, but above the erosion area are several trees that would be at risk of collapse if the erosion continues. Several dead trees that have been undercut by the erosion site and have fallen would be removed prior to placement of riprap, and one live tree would be removed to provide equipment access. Repair would consist of placing approximately 500 cubic yards of clean rock slope protection by crane using a clamshell, which would return the bank to levee design conditions with a slope between 2.5:1 and 3:1. The crane would be positioned on the concrete platform located in the staging area on the right bank of the waterway and adjacent to the KLOG structure (Figure 2-2). Alternatively, the rock may be placed using a long reach excavator from the top of the right bank. Material would be placed directly onto the erosion site, and a bobcat would be used to reposition rock as necessary. Silt fencing/curtains would be set up around the extent of the in-water work area to prevent any sediment that may be disturbed and suspended during placement of the riprap from increasing turbidity in the CBD and the Sacramento River, as this portion of the action area would not be dewatered. The toe of the silt fencing would be trenched so that the downslope face of the trench is flat and perpendicular to the line of flow. The fencing would be inspected daily and repaired as needed, with accumulated silt being removed when it reaches a depth of 6 inches. The erosion site repair would be the only portion of the proposed action that involves the permanent placement of fill material within the natural substrate of the CBD.

Barrier Construction

Once the barrier construction site is dewatered and dry, the existing concrete sill immediately downstream of the gates would be removed to the edge of the existing wing walls using a jackhammer to accommodate the five new concrete wing walls that would house the picket weirs (Figure 2-3). The new wing walls would be approximately 37 feet long (including the existing wing walls), 14 feet high, and 14 inches thick, and there would be approximately 16 feet between each wall. The new wing walls would be constructed so that they incorporate the existing wing walls. The new wing walls would be formed and constructed in place on the existing dewatered apron slab. Rebar would be inserted into the existing apron slab and encapsulated by the new wing walls. A total of five 14-inch-thick walls would be built, creating four individual channels extending out from the KLOG structure, with two flap gates draining into each of the four channels (Figure 2-4). As there are two gates in each channel, an existing gate wing wall would remain in the middle of each new channel. The new wing walls would extend toward the downstream edge of the larger concrete apron, stopping 3 feet short of the end of the slab. This 3-foot-wide section would allow workers to walk between the wing walls and the edge of the slab for future routine maintenance during low-flow conditions. This space would also accommodate the dewatering structure for construction. The existing catwalk would be removed in order to accommodate the new wing walls, and a new catwalk would be installed approximately 2 feet higher than the existing one.

Once the wing walls are constructed, the metal picket weirs would be installed in each of the four channels. The hinge point of the picket weirs would be placed at the upstream extent of the demolished concrete sill, below the edge of the existing wing walls, and the picket weirs would extend out approximately 29 feet (Figure 2-4). The picket weirs would be stainless steel, and the bars of the picket weirs would have an outside diameter of 1.5 inches with 1 inch of space in

between each of the bars. Cable winches would be installed at the top of the KLOG structure and used to raise and lower the picket weirs, and stilling wells would be installed to monitor water surface elevations and inform operation of the picket weirs. The picket weirs would be designed with a maximum picket angle of 30 degrees from horizontal when the water surface is up to the top of the 14-foot high wing walls. At very low flows, the downstream end of the pickets would not exceed the length of the wing walls, maintaining the 3-foot clearance that would allow maintenance access. The picket weirs would allow water from the KLOG to continue to flow through the weir, but as the pickets rise during periods when salmon could be present, the pickets would prevent them from reaching the gates and continuing upstream through the gates. In addition, the picket weir would be designed, constructed, and operated to meet National Marine Fisheries Service's (NMFS) requirements in the Anadromous Salmonid Passage Facility Design guide. Finally, cameras would be installed on the KLOG structure so debris loading would be monitored remotely.

2.3.2.3 Site Access and Staging

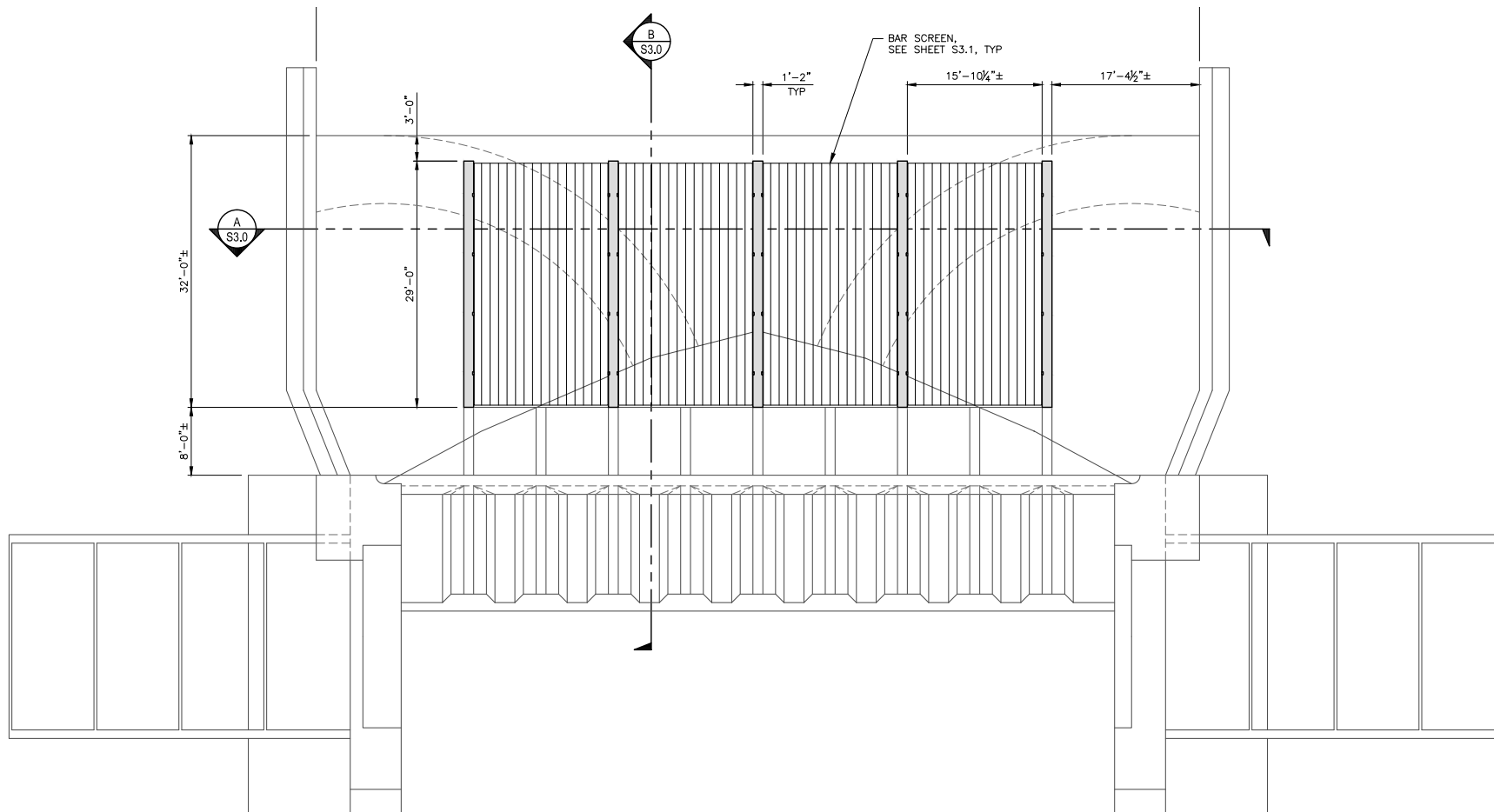
Equipment and materials would be transported from SR 45 on local roadways and levee-top roads to the construction site. Road 108, which runs along the top of the left bank levee and would provide access to the left bank, would be closed for the full duration of construction, but would maintain local, levee maintainer, and emergency access. The site would be accessed from both sides of the structure. The right bank would be accessed using the gravel road that begins at SR 45 and runs along the right bank levee top. Access for construction equipment would require the removal of small amounts of scrub vegetation, and pruning of additional trees may be necessary. An approximately 0.6-acre staging area would be established on the top and landside of the right bank levee, and an additional 0.4-acre staging area in an adjacent open lot would be used to store smaller equipment, as well as possibly place a trailer to be used as an temporary office (Figure 2-1). Access from the second staging area to the construction area would be via an existing access road that connects the residential neighborhood to the levee-top road. Access for erosion site repairs on the right bank would be from the top of the levee, and workers would walk down to the erosion site from the levee top. Road 108 on the left bank would also provide equipment and construction personnel access to the site. All waste material, consisting primarily of concrete debris, would be transported by dump truck to the Yolo County Central Landfill (YCCL).

2.3.2.4 Construction Equipment and Personnel

Approximately 10 individuals would be expected to be onsite daily during construction of the proposed action. Private worker vehicles would be parked along the levee top roads on either side of the channel, or adjacent to the open lot staging area. Typical equipment used at the construction site would include one of each of the following: crane with clamshell or long-reach excavator, bobcat, dump truck, a concrete pumping truck, and jackhammers.

2.3.2.5 Construction Schedule

Construction is expected to occur from 7:00 a.m. to 7:00 p.m. Monday through Friday from September 1, 2015 to October 31, 2015. Water barrier installation and erosion repair would begin once site access has been established and environmental controls have been installed. Water barrier installation is expected to take 2 days and would be immediately followed by barrier construction, which is expected to take approximately 40 days to complete. Erosion repair would take approximately 5 days to complete. However, the construction start date is dependent on water elevations and permit acquisition.



BOTTOM PLAN
SCALE: $\frac{1}{8}'' = 1'-0''$

P0974.14.001

Source: VE Solutions, Inc.



Figure 2-4
Barrier Design

2.3.2.6 Operation and Maintenance Activities

The fish barrier would be owned by the CVFPB and operated and maintained by DWR's West Sacramento Maintenance personnel. The picket weirs would be raised when the water surface elevations are between 3 feet and 14 feet above the concrete apron. The weirs would be lowered to be flush with the concrete apron once water surface elevations at the concrete apron drop below 3 feet or rise above 14 feet. Water level sensors in the stilling wells would record water surface elevations every 15 minutes, and the actuator motor for the cable winches would be programmed to raise and lower the picket weirs remotely according to recorded water surface elevations so that the picket weirs maintain 2 feet of freeboard at their outboard end. The picket weirs would be lowered only after water levels persist below 3 feet for more than 3 days. This would minimize initial raising of the weir, which has the potential to trap upmigrating salmon.

The picket weirs would be checked annually for damage or more frequently if heavy debris loading is observed via the monitoring cameras. Accumulated debris would be removed by temporarily lowering the pickets, which would allow the debris to flush downstream, and the pickets would then be raised again. Debris may also be removed by raising the pickets to a vertical position and raked or power washed. Maintenance and inspection activities would occur between July 1 and October 31 when water levels are typically low. The gates on the KLOG structure would be closed to allow workers to access the picket weirs. During maintenance or repair activities, the two existing radial gates that serve each channel/picket weir would be closed to provide suitable conditions for debris removal and to eliminate attraction flows into the affected channel and picket weir and allow for easier maintenance. The picket weirs would be inspected for damage, and the actuator motors would be serviced. Extra picket weirs would be constructed so damaged picket weirs could be readily replaced if necessary. Any damaged picket weirs would be replaced by crane, and the damaged picket weirs would then be repaired offsite. After cleaning or repairing the picket weir will be returned to its normal operating position, and the radial gates will be reopened. Each subsequent channel/picket weir would be maintained in a similar manner, as necessary. No dewatering would be necessary as part of operations and maintenance, and the crane would be the only machinery needed. Some pruning of trees on the right bank may be necessary to provide crane access, but no tree removal would be needed.

Operations and maintenance activities associated with the proposed action include operation and maintenance of the picket weirs for a period of 30 years (until October 31, 2045). The operation of the existing KLOG gates will continue as current operations through the life of the project, except for periodic cleaning or repairing of the picket weirs. Flow through the KLOG would not be changed by the proposed action. Inspection, operation, and maintenance of the picket weirs would be conducted according to protocols that would be developed based on NMFS criteria (National Marine Fisheries Service 2008), particularly during adult migration seasons, to ensure that the picket weirs function as designed.

2.3.3 Environmental Commitments

Environmental commitments are measures proposed as elements of the proposed action and are considered in conducting the environmental analysis and determining effects and findings. The purpose of environmental commitments is to reflect and incorporate best practices into the proposed action that would avoid, minimize, or offset potential environmental effects. These best practices tend to be standardized and compulsory; they represent sound and proven methods to reduce the potential effects of an action. Environmental commitments demonstrate that the project

proponent commits, in good faith, to undertake and implement measures as part of the proposed action in advance of impact findings and determinations with the intent to improve the quality and integrity of the proposed action, streamline the environmental analysis, and demonstrate responsiveness and sensitivity to environmental quality.

To avoid and minimize construction-related effects, RD 108 would implement the environmental commitments listed below to reduce or offset short-term, construction-related effects.

2.3.3.1 Protect Fish in Dewatered Construction Zone

A qualified fish biologist will be onsite during the installation of water barriers and during the dewatering process to remove any trapped salmonids and other fish from the dewatered area. The fish will be relocated to suitable habitat downstream of the work area. Protocols for the capture, handling, and release of fish will be developed in cooperation with National Oceanic and Atmospheric Administration (NOAA) Fisheries, CDFW, and RD 108. Fish biologists will contact NOAA Fisheries and CDFW immediately if any steelhead, Chinook salmon, white sturgeon, or green sturgeon are found alive, dead, or injured.

2.3.3.2 Turbidity Monitoring

RD 108 or its contractor would monitor turbidity in the CBD during construction to determine whether turbidity is being affected by construction and ensure that construction does not affect turbidity levels, which ultimately increase the sediment loads.

The *Water Quality Control Plan (Basin Plan) for the Sacramento River and San Joaquin River Basins (Fourth Edition)* (Central Valley Regional Water Quality Control Board 2011) contains turbidity objectives for the CBD. Specifically, the plan states that where natural turbidity is less than 1 Nephelometric Turbidity Unit (NTU), controllable factors shall not cause downstream turbidity to exceed 2 NTUs; where natural turbidity is between 1 and 5 NTUs, increases shall not exceed 1 NTU; where natural turbidity is between 5 and 50 NTUs, turbidity levels may not be elevated by 20% above ambient conditions; where ambient conditions are between 50 and 100 NTUs, conditions may not be increased by more than 10 NTUs; and where natural turbidity is greater than 100 NTUs, increases shall not exceed 10 percent.

Monitoring would continue approximately 1,000 feet downstream of construction activities to determine whether turbidity is being affected by construction. Grab samples would be collected at a downstream location that is representative of the flow near the construction site. If there is a visible sediment plume being created from construction, the sample would represent this plume. Monitoring would occur hourly during the placement of riprap and dewatering, and once a week on a random basis during the remaining construction period.

If turbidity limits exceed Basin Plan standards, construction-related earth-disturbing activities would slow to a point that would alleviate the problem. RD 108 would notify the Central Valley Regional Water Quality Control Board (Regional Water Board) of the issue and provide an explanation of the cause.

Chapter 3

Affected Environment and Environmental Effects

3.1 Introduction

This chapter provides an overview of the existing physical environment and regulatory requirements for each of the resources that may be affected by the proposed action. The Council on Environmental Quality's (CEQ's) regulations for implementing NEPA specify that a Federal agency must consider the effects of the proposed action on the environment.

The significance thresholds used encompass the factors taken into account under NEPA to evaluate the context and the intensity of the effects of the proposed action and are included in applicable resource chapters (40 CFR 1508.27). Significance criteria used to define the level at which an effect would be considered significant were based on the checklist presented in Appendix G of the CEQA Guidelines; factual or scientific information and data; and regulatory standards of Federal agencies.

3.1.1 Terminology

The following terminology is used in this document to describe the level of significance of effects.

- An effect is considered *beneficial* if it would provide benefit to the environment as defined for that resource.
- A finding of *no effect* is appropriate if the analysis concludes that the proposed action would not affect the particular topic area in any adverse way.
- An effect is considered *less than significant* if the analysis concludes that it would cause no substantial adverse change to the environment and requires no mitigation.
- An effect is considered *less than significant with mitigation incorporated* if the analysis concludes that it would cause no substantial adverse change to the environment with the inclusion of one or more feasible mitigation measures.
- An effect is considered *significant* if it would cause a substantial adverse change in the physical conditions of the environment. Effects determined to be significant based on the significance criteria fall into two categories: those for which there is feasible mitigation available that would avoid or reduce the environmental effects to less-than-significant levels and those for which either there is no feasible mitigation available or for which, even with implementation of feasible mitigation measures, there would remain a significant adverse effect on the environment. Those effects that cannot be reduced to a less-than-significant level by mitigation are identified as *significant and unavoidable*.
- An effect is considered *significant and unavoidable* if the analysis concludes that it could have a substantial adverse change on the environment that cannot be avoided or mitigated to a less-than-significant level if the proposed action is implemented.

3.2 Resources Not Likely to Be Affected

Initial evaluation of the proposed action indicated that there likely would be little effect on several resources, which are discussed below to add to the overall understanding of the proposed action. There would be no effect on agriculture, land use, mineral resources, population and housing, public services, and utilities.

3.2.1 Aesthetics

The proposed action consists of modifications to the downstream face of the KLOG structure (Figure 2-1), and all construction would take place between the banks of the CBD. Rock slope protection would be placed along the right bank of the CBD, requiring minimal vegetation removal, between the existing rock slope protection and the edge of the existing KLOG structure. Agricultural lands are located to the north of the action area. Residential land uses are located to the south of the action area, but the CBD levee, trees along the CBD, and residential privacy fencing all prevent direct views of the action area from the residences. Most direct views of the site are available to land-based roadway users and recreationists using the CBD levees and water-based recreationists on the CBD.

Scenic vista views are available from local roadways that consist of mid- to long-range views out and over agricultural fields that sometimes extend to the Blue and Rocky Ridges and the Coast Ranges, west of Interstate 5. These scenic vista views are available toward the northwest from Road 108, which is directly adjacent to and northwest of the construction site; however, scenic vista views toward the southeast are not available because views from Road 108 are prevented due to trees along the CBD and development within Knights Landing. Because the staging areas would be reverted back to their original uses once construction is complete, the proposed action would not affect scenic vista views that are available to the northwest.

The County of Yolo *2030 Countywide General Plan* Conservation and Open Space Element identifies that there are no Federal or state scenic routes in the county (County of Yolo 2009:CO-6). However, the Land Use Element identifies that County Road 116 and 116B from Knights Landing to County Road 16 is a County-designated scenic roadway (County of Yolo 2009:LU-30). While in close proximity to County Road 116/116B, the construction site is not visible from the roadway because development and trees within Knights Landing prevent views of the site and, therefore, the proposed action would not affect available views from this scenic route.

In addition, construction would take place between the hours of 7:00 a.m. to 7:00 p.m. and not require the use of high-intensity lighting for nighttime construction, and the proposed action does not include the introduction of any light sources. Changes to the KLOG structure and placing rock slope protection would not increase glare because the new concrete and rock slope protection would be in keeping with existing materials at the construction site, they would have relatively small surface areas and low reflectivity, and they would weather within one season, further reducing the potential for glare. Therefore, there would be little to no effects resulting from light and glare.

The proposed action would also not result in a substantial change in the existing visual character or quality of the site. As previously described, the new concrete and rock slope protection would be in keeping with existing materials at the construction site. Changes to the KLOG structure would be visually in keeping with the existing structure and would not be out of place or alter conditions at

the site in a notable manner. Similarly, the area to receive rock slope protection is small and would tie into the KLOG structure and existing rock slope protection that is immediately adjacent to the erosion site. Therefore, the new rock slope protection would be a visual extension of existing conditions at the site and not result in notable visual changes at the construction site. Vegetation removal would be minimal and would be mitigated offsite.

Overall, the proposed action would have little to no effect on aesthetic resources, and these resources are not considered further in this document.

3.2.2 Geology and Soils

The proposed action is located in water, with soil map units on each side of stream identified by the U.S. Department of Agriculture Natural Resources Conservation Service as Sacramento clay on the north side of the stream and Sycamore silt loam (drained) on the south side of the stream (Andrews 1972). The Sacramento clay soil type has high shrink-swell potential, and the erosion hazard is considered none to slight.¹ The Sycamore silt loam soil type has moderate shrink-swell potential and the erosion hazard is considered none to slight.

The proposed action would not expose people to the rupture of an earthquake fault or other seismic ground shaking, as there are no faults running through or adjacent to the construction site. The active fault nearest to the action area is the Dunnigan Hills fault, which is 10 miles to the west of the action area.

Part of the proposed action is designed to stabilize and protect the soils on the riverbank and would involve the placement of riprap. No structures would be placed on top of the repaired erosion site, and the remaining work would be conducted on an existing concrete pad. The proposed action would not expose people or structures to substantial adverse effects related to fault rupture, groundshaking, liquefaction, or landslides. Construction would occur on unstable or expansive soil, but the only structure that would be built would be on an existing concrete pad and would not pose a risk of offsite landslide, lateral spreading, subsidence, liquefaction, or collapse. The proposed action is not located in an area that requires the disposal of wastewater or where it would destroy a paleontological resource or geologic feature. The erosion site repairs would prevent future erosion and would stabilize soils in the area and would, therefore, be beneficial. Consequently, effects related to geology and soils are not considered further in this document.

3.2.3 Recreation

Construction of the proposed action would not increase the use of existing recreational facilities and would not cause physical deterioration of any recreational facilities. A levee-top access road that is used for recreation runs adjacent to a proposed staging area and may experience temporary closures while construction vehicles access the construction site, but access would be restored once construction is complete. Also, the proposed action would not have any effect on the boat ramp located downstream of the site, as an in-water barrier prevents access to the CBD just upstream of the ramp. The proposed action would not require the construction or expansion of recreation facilities. Construction of the proposed action would result in waters in the action area being unavailable to informal recreation activities, such as fishing. However, the amount of area that

¹ Some or all of the construction site soils have been altered due to nearby levee construction/modification and other anthropogenic activities as a result of its urban setting.

would be made unavailable would be negligible, particularly given the areas available downstream and on the Sacramento River. Furthermore, construction activities would be short-term. The action would have no effect on recreational facilities, and recreation resources are not considered further in this document.

3.2.4 Transportation/Traffic

Construction of the proposed action would involve minimal vehicle trips due to the small amount of construction involved. A total of 10 personnel would be onsite on any given day, and only one dump truck and one concrete pumping truck would be needed to haul material to and from the site. Construction vehicles accessing the site may temporarily slow traffic as they turn onto Road 108 or the levee-top road on the right bank, but the proposed action would not conflict with any applicable plan, ordinance, or policy related to the performance of the circulation system or with any congestion management program. There would be no change to air traffic patterns and no increase in hazards because of design features; implementation of the proposed action would not result in inadequate emergency access. There are no public transit or bicycle facilities that would be affected by the proposed action. Road 108 would be closed between SR 45 and Road 112 during construction. However, Road 108 only provides access to the levee top and adjacent agricultural fields. The closure may require a few vehicles to use other routes to reach Road 108 west of its intersection with Road 112, but Road 112 also connects to SR 45 and would provide a bypass for the few vehicles that use Road 108 and the effect on circulation would be negligible.

The levee-top access road that is open to pedestrian use on the right bank may have temporary closures while construction vehicles enter or exit the action area, but the closures would be brief and would not reduce the performance or safety of the road. Signage notifying the public of construction activities and temporary pedestrian access closure would be displayed on the landside of both levees. Use of the staging area in the adjacent empty lot may result in some construction personnel parking along the street and walking to the construction site via an access road that connects the residential neighborhood to the levee-top road (Figure 2-1). Smaller construction equipment may also be transported via this route. However, the increase in traffic would be negligible and would not affect circulation in the neighborhood. Therefore, effects related to transportation and traffic are not considered further in this document.

3.2.5 Environmental Justice

Environmental justice issues are mandated and regulated primarily at the Federal level. Federal Executive Order 12898, Federal Action to Address Environmental Justice in Minority Populations and Low-Income Populations, requires all Federal agencies to address potential effects regarding environmental justice when considering actions. The order states that neither minority nor low-income populations may be subject to a disproportionate level of adverse effects as a result of an action.

The action area is located in census tract 114 in Yolo County, which contains some areas of low-income and minority populations (U.S. Census Bureau 2010, 2013a, 2013b). While construction activity is expected to result in temporary noise and air quality effects, among others, on those residing near the action area, these effects would be felt by all adjacent residents equally, and would not disproportionately affect any minority or low-income population. Therefore, there would be no environmental justice effects, and this issue is not considered further in this document.

3.3 Hydrology and Water Quality

3.3.1 Introduction

This section analyzes the proposed action's potential effects related to hydrology and water quality. It describes existing conditions in the action area and summarizes the overall Federal, state, and local regulatory framework for hydrology and water quality, and analyzes the potential for the proposed action to affect these resources.

3.3.2 Existing Conditions

The proposed action is within the Sacramento River Hydrologic Region. The Sacramento River Hydrologic Region encompasses an area of approximately 17.4 million acres (27,200 square miles) and contains all or large portions of Modoc, Siskiyou, Lassen, Shasta, Tehama, Glenn, Plumas, Butte, Colusa, Sutter, Yuba, Sierra, Nevada, Placer, Sacramento, El Dorado, Yolo, Solano, Lake, and Napa Counties (California Department of Water Resources 2003a). Most of northern California is located in the Sacramento River Hydrologic Region, which encompasses several watersheds of various sizes.

According to the U.S. Geological Survey (USGS), the action area is within the Sacramento-Stone Corral watershed (USGS Hydrologic Unit Code #18020104) (U.S. Geological Survey 1978).

3.3.2.1 Surface Water Hydrology

The existing KLOG structure is located in the CBD, approximately 0.25 mile from its confluence with the Sacramento River near the community of Knights Landing, just below River Mile 90, in Yolo County (Figure 1-1). The CBD in the action area is approximately 100 feet wide (at low water) and drains in a northeasterly direction. The CBD collects all drainage from the Colusa Basin watershed, which spans areas of Glenn and Yolo Counties. The watershed extends from the Stony Creek watershed in the north to the Cache Creek watershed to the south, and from the Sacramento River in the east to the Inner Coast range foothills to the west, and covers approximately 1,045,445 acres (1,635 square miles) (H.T Harvey & Associates et al. 2008).

Stream flow through the KLOG structure is controlled by eight 66-inch and two 42-inch screw operated slide gates on the CBD side and by eight 66-inch and two 42-inch combination flap and slide gates on the Sacramento River side. The configuration allows for control of stream flows in either direction and allows automatic outflows from the CBD at lower stages in the Sacramento River.

The KLOG structure protects the lower Colusa Basin from backwater of the Sacramento River during floods and helps control water levels in the CBD for irrigation and drainage. The riverside slide gates are closed year round with the flap gates active. The flap gates discharge water to the Sacramento River if the river stage in the CBD is higher than the Sacramento River stage, and they prevent reverse flow when the Sacramento River stage is higher. The volume of discharge depends on the number of open gates as well as the height of the gate openings. The riverside slide gates are opened only when maintenance activities are required. Screw-operated gates at the upstream end are operated to maintain required pool elevation, currently at 25.5 feet United States Engineering

Datum (23.73 feet, North American Vertical Datum of 1988), during irrigation season based on local interests. (cbec in preparation: 1.)

In brief, streamflows at the KLOG are based on flow conditions caused by the slide gate and flap gate settings relative to the head difference of 1) the stage of the gage on the CBD, which is upstream of the gates and 2) the stage of the gage on the Sacramento River at Knights Landing, which is downstream of the gates.

3.3.2.2 Groundwater Hydrology

DWR delineates groundwater basins throughout California under the state's Groundwater Bulletin 118. The proposed action is located in the Sacramento Valley Groundwater Basin, Colusa Subbasin (Basin No. 5-021.52). The Colusa Subbasin has a total surface area of 918,380 acres (1,434 square miles). It is bounded on the east by the Sacramento River, on the west by the Coast Range and foothills, on the north by Stony Creek, and on the south by Cache Creek.

Groundwater level data show an average seasonal fluctuation of approximately 5 feet for normal and dry years, and there does not appear to be any increasing or decreasing trend in groundwater levels in the Colusa subbasin. Based on available information, DWR calculated groundwater storage capacity in the subbasin at 13,025,887 acre-feet to a depth of 200 feet (California Department of Water Resources 2003b).

3.3.2.3 Surface Water Quality

The Basin Plan (Central Valley Regional Water Quality Control Board 2011) describes beneficial uses for the CBD and the Sacramento River (Table 3.3-1). CWA Section 303(d) establishes the total maximum daily load (TMDL) process to assist in guiding the application of state water quality standards. Section 303(d) requires states to identify streams in which water quality is impaired (i.e., affected by the presence of pollutants or contaminants) and to establish the TMDL—the maximum quantity of a particular contaminant that a water body can assimilate without experiencing adverse effects. Table 3.3-2 shows 303(d) listed impairments for the CBD and the Sacramento River in the vicinity of the action area based on the 2010 California Integrated Report (California State Water Resources Control Board 2011).

Table 3.3-1. Designated Beneficial Uses for Surface Water Bodies within the Action Area Vicinity

Water Body	Designated Beneficial Uses
Colusa Basin Drain	Irrigation; stock watering; water contact recreation; warm freshwater habitat; cold freshwater habitat ^a ; warm fish migration; warm fish spawning; wildlife habitat.
Sacramento River (from the Colusa Basin Drain to the I Street Bridge in Sacramento)	Municipal and domestic supply; irrigation; water contact recreation; non-contact water recreation; warm and cold freshwater habitat; warm and cold fish migration; warm and cold fish spawning; wildlife habitat; navigation.
Source: Central Valley Regional Water Quality Control Board 2011.	
^a Potential beneficial use.	

Table 3.3-2. 303(d) Listed Impaired Waters with Potential to be Affected by the Proposed Action

Water Body	Pollutant Stressors	Potential Sources	TMDL Completion Date
Colusa Basin Drain	Azinphos-methyl (Guthion)	Unknown	Est. 2019
	Carbofuran	Unknown	Est. 2021
	DDT (Dichlorodiphenyltrichloroethane)	Unknown	Est. 2021
	Diazinon	Unknown	Est. 2008
	Dieldrin	Unknown	Est. 2021
	Escherichia coli (E. coli)	Unknown	Est. 2021
	Group A Pesticides	Unknown	Est. 2019
	Low Dissolved Oxygen	Unknown	Est. 2021
	Malathion	Unknown	Est. 2010
	Mercury	Unknown	Est. 2021
	Unknown Toxicity	Unknown	Est. 2019
Sacramento River (Red Bluff to Knights Landing)	DDT (Dichlorodiphenyltrichloroethane)	Unknown	Est. 2021
	Dieldrin	Unknown	Est. 2021
	Mercury	Unknown	Est. 2021
	PCBs (Polychlorinated biphenyls)	Unknown	Est. 2021
	Unknown Toxicity	Unknown	Est. 2019
Sacramento River (Knights Landing to the Delta)	Chlordane	Unknown	Est. 2021
	DDT (Dichlorodiphenyltrichloroethane)	Unknown	Est. 2021
	Dieldrin	Unknown	Est. 2022
	Mercury	Unknown	Est. 2012
	PCBs (Polychlorinated biphenyls)	Unknown	Est. 2021
	Unknown Toxicity	Unknown	Est. 2019

Source: California State Water Resources Control Board 2011.
 Est. = Estimated
 TMDL = total maximum daily load

Overall, the water quality of the CBD has been historically affected by pesticides associated with rice farming. A management program was enacted in the 1980s to reduce the levels of rice pesticides in surface water, which led to numerous improvements including significant declines in rice pesticides in both the CBD and the Sacramento River. Other (non-rice) pesticides are abundant in the CBD (Table 3.3-2); however, the surface water quality in the Colusa Basin watershed is generally adequate to support existing uses (which are predominantly agricultural). (H.T Harvey & Associates et al. 2008)

The water quality of the Sacramento River is good to excellent, with relatively cool water temperatures, low biochemical oxygen demand, medium to high dissolved oxygen, and low mineral and nutrient content. In general, the surface water quality of the Sacramento River is representative of agricultural return flows, urban runoff, and natural sedimentation from scouring. The quality of

surface water appears to be largely unaffected by the presence of pesticides and other constituents in the CBD (H.T Harvey & Associates et al. 2008).

3.3.2.4 Groundwater Water Quality

Groundwater quality in the subbasin is characterized as a calcium magnesium or magnesium bicarbonate type (California Department of Water Resources 2003b). Total dissolved solids (TDS) values range from 120 to 1,220 milligrams per liter (mg/L), averaging 391 mg/L. Local (in the vicinity of Knights Landing) impairments include high TDS, boron, and nitrates (California Department of Water Resources 2003b).

Groundwater quality in the Colusa Basin watershed is generally acceptable for agricultural purposes—with the exception of boron, no naturally occurring groundwater constituent prevents the use of groundwater for irrigation (H.T Harvey & Associates et al. 2008).

3.3.2.5 Flooding and Flood Management

During the flood events of 1986, 1997, 2006, and 2011, the stage of the Sacramento River was consistently higher than the CBD at the peak of the flood wave, resulting in no stream flow through the KLOG structure. However, at the far ends of the rising and/or receding limbs of the hydrographs, there are occasions where the CBD water levels are higher than the stage in Sacramento River, resulting in stream flow (up to 1,370 cfs during the four historic floods) through the KLOG structure. Based on historic record, the maximum flow through the KLOG structure is 2,220 cfs. (cbec in preparation: 1.)

The banks on each side of the KLOG structure are SRFCP levees. The Knights Landing Ridge Drainage District maintains the south levee upstream of the KLOG, and Yolo County Service Area 6 maintains the south levee downstream of the KLOG. Reclamation District 787 maintains the north levee upstream of the KLOG, and the Sacramento River Westside Levee District maintains the north levee downstream of the KLOG.

The proposed action is considered to be within a 100-year floodplain (Zone A) as designated by the Federal Emergency Management Agency (FEMA) (Federal Emergency Management Agency 2010).

3.3.3 Regulatory Setting

3.3.3.1 Federal

The following Federal regulations related to hydrology and water quality may apply to implementation of the proposed action.

Clean Water Act Sections 404, 401, and 303(d)

Section 404

CWA Section 404 regulates the discharge of dredged and fill materials into “waters of the United States,” which include oceans, bays, rivers, streams, lakes, ponds, and wetlands. Proposed action proponents must obtain a permit from USACE for all discharges of dredged or fill material into waters of the United States before proceeding with a proposed activity. Before any actions that may affect surface waters are implemented, a delineation of jurisdictional waters of the United States

must be completed, following USACE protocols, to determine whether the action area contains wetlands or other waters of the United States that qualify for CWA protection.

Section 401

Under Federal CWA Section 401, applicants for a Federal license or permit to conduct activities that may result in the discharge of a pollutant into waters of the United States must obtain certification from the state in which the discharge would originate or, if appropriate, from the interstate water pollution control agency with jurisdiction over affected waters at the point where the discharge would originate. Therefore, all actions that have a Federal component and may affect state water quality (including actions that require Federal agency approval [such as issuance of a Section 404 permit]) also must comply with CWA Section 401. In California, the authority to grant water quality certification has been delegated to the State Water Resources Control Board (State Water Board), and applications for water quality certification under CWA Section 401 typically are processed by the Regional Water Quality Control Boards with local jurisdiction. Water quality certification requires evaluation of potential impacts in light of water quality standards and CWA Section 404 criteria governing discharge of dredged and fill materials into waters of the United States.

Section 303(d) and Total Maximum Daily Loads

In California, the State Water Board develops the list of water quality-limited segments; the U.S. Environmental Protection Agency (EPA) approves each state's list. Waters on the list do not meet water quality standards, even after point sources of pollution have installed required pollution control technology. Section 303(d) also establishes the TMDL process to improve water quality in listed waterways.

Rivers and Harbors Appropriation Act of 1899

The River and Harbors Appropriation Act of 1899 addresses activities that involve the construction of dams, bridges, dikes, and other structures across any navigable water, or that place obstructions to navigation outside established Federal lines and excavate from or deposit material in such waters. Such activities require permits from USACE.

Section 14

Section 14 (33 USC 408) requires approval from the USACE Chief of Engineers, or designee, for alterations to certain public works, including Federal project levees, so long as the alteration would not be injurious to the public interest and does not impair the usefulness of the work. Section 408 alterations would include actions that could change the hydraulic capacity of the floodway or change the authorized geometry of the Federal project. As described in Chapter 1, RD 108 is seeking approval under 33 USC Section 408, supported by this Environmental Assessment.

National Flood Insurance Program

The National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973 were intended to reduce the need for large, publicly funded flood risk management structures and disaster relief by restricting development on floodplains. FEMA administers the National Flood Insurance Program (NFIP) to subsidize flood insurance to communities that comply with FEMA regulations limiting development in floodplains. FEMA issues Flood Insurance Rate Maps for communities participating in the NFIP. These maps delineate flood hazard zones in the community.

These maps are designed for flood insurance purposes only and do not necessarily show all areas subject to flooding. The maps designate lands likely to be inundated during a 100-year storm event and elevations of the base flood. They also depict areas between the limits affected by 100-year and 500-year events and areas of minimal flooding. These maps often are used to establish building pad elevations to protect new development from flooding effects.

Requirements for Federal Emergency Management Agency Certification

For guidance on floodplain management and floodplain hazard identification, communities turn to FEMA guidelines, as defined in 44 CFR 59 through 77. In order for a levee to be recognized by FEMA under the NFIP, the community must provide evidence demonstrating that adequate design and operation and maintenance systems are in place to provide reasonable assurance that protection from the base flood (1% or 100-year flood) exists. These specific requirements are outlined in 44 CFR 65.10, Mapping of Areas Protected by Levee Systems.

U.S. Army Corps of Engineers Levee Design Criteria

All levees included in the action area are Federally authorized and fall within the jurisdiction of USACE. The levee evaluation for the action area conforms to the engineering criteria established by USACE for the assessment and repair of levees.

Executive Order 11988 Floodplain Management

Executive Order 11988 addresses floodplain issues related to public safety, conservation, and economics. The order generally requires Federal agencies constructing, permitting, or funding actions meet the following requirements.

- Avoid incompatible floodplain development.
- Be consistent with the standards and criteria of the NFIP.
- Restore and preserve natural and beneficial floodplain values.

3.3.3.2 State

The following state regulations related to hydrology and water quality may apply to CVFPB and RD 108's implementation, construction, operation, and maintenance of the proposed action.

Porter-Cologne Water Quality Control Act of 1969

The Porter-Cologne Water Quality Control Act established the State Water Board and nine Regional Water Boards as the primary state agencies with regulatory authority over California water quality and appropriate surface water rights allocations. Under this act (and the CWA), the state is required to adopt a water quality control policy and waste discharge requirements to be implemented by the State Water Board and nine Regional Water Boards. The State Water Board also establishes Water Quality Control Plans (Basin Plans) and statewide plans. The Regional Water Boards carry out State Water Board policies and procedures throughout the state. Basin Plans designate beneficial uses for specific surface water and groundwater resources and establish water quality objectives to protect those uses.

Central Valley Regional Water Quality Control Board

The Regional Water Board is responsible for implementing its Basin Plan (2011) for the Sacramento River and its tributaries. The Basin Plan identifies beneficial uses of the river and its tributaries and water quality objectives to protect those uses. Numerical and narrative criteria are contained in the Basin Plan for several key water quality constituents, including dissolved oxygen, water temperature, trace metals, turbidity, suspended material, pesticides, salinity, radioactivity, and other related constituents.

California Fish and Game Code Section 1602 Streambed Alteration Agreement

Under Chapter 6 of the CFGC, CDFW is responsible for the protection and conservation of the state's fish and wildlife resources. Section 1602 et seq. of the code defines the responsibilities of CDFW and requires that public and private applicants obtain an agreement to "divert, obstruct, or change the natural flow or bed, channel, or bank of any river, stream, or lake designated by the CDFW in which there is at any time an existing fish or wildlife resource or from which those resources derive benefit, or will use material from the streambeds designated by the department." A streambed alteration agreement is required under Section 1602 of the CFGC for all activities that involve temporary or permanent activities within state jurisdictional waters.

Central Valley Flood Protection Plan

According to California Government Code Sections 65302.9 and 65860.1, every jurisdiction located within the Sacramento–San Joaquin Valley is required to update its general plan and zoning ordinance in a manner consistent with the Central Valley Flood Protection Plan (CVFPP) within 24 months after the CVFPP's adoption, which occurred on June 29, 2012. In addition, the locations of the state and local flood management facilities, locations of flood hazard zones, and the properties located in these areas must be mapped and consistent with the CVFPP.

Central Valley Flood Protection Board

The CVFPB (formerly the California Reclamation Board) of the State of California regulates the modification and construction of levees and floodways in the Central Valley defined as part of the Sacramento Valley and San Joaquin Valley flood control projects. Rules promulgated in Title 23 of the CCR (Title 23, Division 1, Article 8 [Sections 111–137]) regulate the modification and construction of levees to ensure public safety. The rules state that existing levees may not be excavated or left partially excavated during the flood season, which is generally November 1 through April 15 for the Sacramento River and Sacramento Bypass.

Title 23, CCR Sections 6 and 7 stipulate permitting authority to the CVFPB. Section 6(a) outlines the need to obtain a permit from the CVFPB for "Every proposal or plan of work, including the placement, construction, reconstruction, removal, or abandonment of any landscaping, culvert, bridge, conduct fence, projection, fill, embankment, building....that involves cutting into the levee wholly or in part within any area for which there is an adopted plan of flood control, must be approved by the board prior to the commencement of work." Section 7(a) requires that "Prior to submitting an encroachment permit application to the board, the application must be endorsed by the agency responsible for maintenance of levees within the area of the proposed work...."

The following CVFPB guidance has been followed during the levee evaluation:

The California Reclamation Board has primary jurisdiction approval of levee design and construction. The Reclamation Board standards are found in Title 23, Division 1, Article 8 (Sections 111 through 137) of the CCR, and constitute the primary state standard. Section 120 of the CCR directs that levee design and construction be in accordance with the USACE's Engineer Manual EM 1110-2-1913, Design and Construction of Levees. This document is the primary Federal standard applicable to the proposed action, as supplemented by additional prescriptive standards contained in Section 120 of the CCR. These additional standards prescribe minimum levee cross-sectional dimensions, construction material types, and compaction levels.

3.3.3.3 Local

The following local regulations related to hydrology and water quality may apply to CVFPB and RD 108's implementation, construction, operation, and maintenance of the proposed action.

Yolo County General Plan

The Conservation and Open Space Element and the Health and Safety Element of the *2030 Countywide General Plan* (Yolo County 2009) contain a number of goals and policies related to water quality and flooding. The following goals and policies from the general plan could apply to the proposed action.

Conservation and Open Space Element

Goals

Goal CO-5: Water Resources. Ensure an abundant, safe, and sustainable water supply to support the needs of existing and future generations.

Policies

Policy CO-5.6. Improve and protect water quality for municipal, agricultural, and environmental uses.

Policy CO-5.13. Ensure that regional, State, and federal water projects protect local water rights and areas of origin.

Policy CO-5.17. Require new development to be designed such that nitrates, lawn chemicals, oil, and other pollutants of concern do not impair groundwater quality.

Policy CO-5.23. Support efforts to meet applicable water quality standards for all surface and groundwater resources.

Health and Safety Element

Goals

GOAL HS-2: Flood Hazards. Protect the public and reduce damage to property from flood hazards.

Policies

Policy HS-2.2: Ensure and enhance the maintenance and integrity of flood control levees.

Policy HS-2.3: Actively update and maintain policies and programs to ensure consistency with state and Federal requirements.

Colusa Basin Watershed Management Plan

The following goals and objectives from the *Colusa Basin Watershed Management Plan* (Colusa County Resource Conservation District 2012) could apply to the proposed action.

Goal 1. Protect, maintain and improve water quality

Objective #3: Encourage and implement measures to protect groundwater from contaminants

Objective #4: Recommend Best Management Practices (BMPs) for agricultural and rangeland areas to reduce soil erosion and associated sediment loading into drainages

Goal 6. Enhance soil quality and reduce erosion

Objective #1: Reduce channel instability and stream bank erosion

Objective #2: Advocate alternatives to non-vegetated streambanks and irrigation ditches

Objective #3: Provide natural soil protection measures to reduce soil erosion and improve soil quality on farm land and range land

Objective #4: Assist land managers with soil erosion reduction measures and soil quality improvements

3.3.4 Significance Criteria

These effects are based on NEPA standards and standards of professional practice. For this analysis, an environmental effect related to hydrology and water quality is considered to be significant if the proposed action would result in any of the effects listed below.

- Violate any water quality standards or waste discharge requirements.
- Otherwise substantially degrade water quality.

3.3.5 Environmental Consequences

3.3.5.1 No Action

The No Action Alternative represents the continuation of existing conditions. No construction-related effects relating to water quality and groundwater resources such as release of contaminants or sediments to surface water would occur. However, flows would continue through the KLOG structure, which would likely continue to erode the right bank of the CBD, which would threaten the integrity of the levee and increase the risk of levee failure and flooding in the surrounding area.

3.3.5.2 Proposed Action

Effect WQ-1: Introduction of Pollutants to Surface Waters (less than significant with mitigation)

Erosion site repair and equipment staging during construction of the proposed action would result in moderate ground disturbance in the action area, and heavy machinery would be used within the confines of the CBD. Contamination of riverbank soils could result from construction activities because heavy machinery would be used within the ordinary high water mark (OHWM) of the CBD. Spills of petroleum products and other pollutants related to machinery could occur during vehicle operation, refueling, parking, and maintenance. Improper handling, storage, or disposal of these

materials in the vicinity of the CBD could cause degradation of surface water quality if they are eventually washed into the CBD (or ultimately the Sacramento River). Placement of riprap below the waterline would stir up sediment and contribute to downstream sedimentation and would increase turbidity. However, silt fencing would be set up around the extent of the inwater work to prevent any sediment that may be stirred up during riprap placement from increasing turbidity in the CBD, which would also prevent downstream sedimentation. The toe of the silt fencing would be trenched so that the downslope face of the trench is flat and perpendicular to the line of flow. The fencing would be inspected weekly and repaired as needed, and accumulated silt would be removed when it reaches a depth of 6 inches.

It would still be possible that soil could be washed downstream during riprap placement if the silt fencing were to be damaged or displaced, and therefore this effect would be potentially significant. However, RD 108 or its contractor would monitor turbidity in the CBD during construction, as described in Section 2.2.7.2, *Turbidity Monitoring*, and as required by the Central Valley Regional Water Board. In addition, implementation of mitigation measures WQ-MM-1 and WQ-MM-2 would ensure that the risk of accidental spills and turbidity increases would be minimized and that this effect would be less-than-significant.

Mitigation Measure WQ-MM-1: Implement a Spill Prevention, Control, and Countermeasure Plan

RD 108 or its contractor will develop and implement a spill prevention, control, and countermeasure plan (SPCCP) to minimize the potential for and effects from spills of hazardous, toxic, and petroleum substances during construction and operation activities, as well as minimize the effects of unearthing previously undocumented hazardous materials. The SPCCP will be completed before any construction activities begin. Implementation of this measure will comply with state and Federal water quality regulations. The SPCCP will describe spill sources and spill pathways in addition to the actions that will be taken in the event of a spill (e.g., an oil spill from engine refueling will be cleaned up immediately with oil absorbents) or the exposure of an undocumented hazard. The SPCCP will outline descriptions of containment facilities and practices such as double-walled tanks, containment berms, emergency shut-offs, drip pans, fueling procedures, and spill response kits. It also will describe how and when employees are trained in proper handling procedure and spill prevention and response procedures.

RD 108 will review and approve the SPCCP before onset of construction activities and routinely inspect the construction area to verify that the measures specified in the SPCCP are properly implemented and maintained. RD 108 will notify its contractors immediately if there is a non-compliance issue and will require compliance.

If a spill is reportable, the contractor's superintendent will notify RD 108, and RD 108 will take action to contact the appropriate safety and cleanup crews to ensure that the SPCCP is followed. A written description of reportable releases must be submitted to the Central Valley Regional Water Board and the Department of Toxic Substances Control (DTSC). This submittal must contain a description of the release, including the type of material and an estimate of the amount spilled, the date of the release, an explanation of why the spill occurred, and a description of the steps taken to prevent and control future releases. The releases will be documented on a spill report form.

Mitigation Measure WQ-MM-2: Implementation of Construction Best Management Practices

RD 108 will require the construction contractor to implement appropriate BMPs that would be utilized to avoid or minimize effects on water quality. Such BMPs will include, but not be limited to, the following:

- **Staging of construction equipment and materials.** To the extent possible, equipment and materials would be staged in areas that have already been disturbed.
- **Minimize soil and vegetation disturbance.** The construction contractor would minimize ground disturbance and the disturbance/destruction of existing vegetation. This would be accomplished, in part, through establishing designated equipment staging areas, ingress and egress corridors, equipment exclusion zones prior to the commencement of any grading operations, and protection of existing trees.
- **Install silt fences.** The construction contractor will install silt fences to prevent sediment-laden water from leaving the construction area.

3.4 Biological Resources

3.4.1 Introduction

This section provides an analysis of potential effects on biological resources, including effects on vegetation and wetland resources, wildlife, and fisheries, resulting from the proposed action.

3.4.2 Existing Conditions

3.4.2.1 Study Area

The 2-acre study area for the biological resources analysis encompasses the proposed construction area, including access and staging areas, which includes the CBD approximately 100 feet downstream of the existing KLOG (Figure 2-1). A reconnaissance survey of most of the study area was conducted on January 27, 2015. The empty lot staging area south of the project site was not surveyed as part of the reconnaissance visit, but was assessed based on aerial and ground-level photographs.

For purposes of assessing effects on fisheries resources (e.g., elevated turbidity and noise), the study area also consists of the CBD water column, canal bottom, and levee banks within the footprint of the proposed KLOG construction and erosion repair (up to the OHWM) and surrounding aquatic habitat.

3.4.2.2 Land Cover Types

The land cover types identified during field surveys of the study area are Great Valley valley oak riparian forest, perennial drainage, nonnative annual grassland, and unvegetated/ developed areas. Each of these land cover types is discussed below and shown in Figure 3.4-1. A list of the plant species observed during the January 27, 2015 reconnaissance site visit is included in Appendix A.

Great Valley Oak Riparian Forest

Great Valley valley oak riparian forest occurs in a narrow band, along the CBD and has an overstory of mature, well-established trees, predominantly valley oak with Oregon ash, Fremont's cottonwood, and black willow (Figure 3.4-1). In the study area, the understory consists primarily of nonnative grasses and ruderal herbaceous species with few shrubs, including buttonbush on the northeast bank and poison oak on the southwest bank downstream of the KLOG. Great Valley valley oak riparian forest is recognized as a sensitive natural community by the California Natural Diversity Database (CNDDB) (California Natural Diversity Database 2015).

Perennial Drainage—Colusa Basin Drain

Within the study area, perennial drainage includes the open water of the CBD and the portion of the riverbank located below the OHWM. The average width of the CBD in the study area is approximately 250 feet. The CBD banks downstream of the KLOG are mostly covered with rock slope protection, except for the area within 166 feet of the KLOG. The CBD drains to the northeast, and the banks on each side of the KLOG are federal project levees. The CBD intercepts all drainage in

the Colusa Basin on the west side of the Sacramento River between the communities of Colusa and Knights Landing. The confluence with the Sacramento River is approximately 1,300 feet downstream of the KLOG.

Nonnative Annual Grassland

The CBD levee banks and fallow field that are proposed as staging areas support nonnative annual grassland species. Grass and forb species observed in this cover type during the site visit included field mustard, soft chess, shepherd's purse, yellow star thistle, bull thistle, field bindweed, whitestem filaree, alkali mallow, Johnsongrass, milk thistle, and newly emerging grasses. Based on a review of annual photographs, the proposed staging area was an orchard in the 1990's, graded in 2007 when Reed Street and the housing development was constructed, and has been regularly maintained by mowing and/or discing since that time .

Unvegetated/Developed

The unvegetated/ developed portions of the study area consist of the KLOG structures, County Road 108, and graveled roads on top of the levees on both sides of the CBD (Figure 3.4-1).

3.4.2.3 Sensitive Biological Resources

Special-Status Species

Special-status species are species that are legally protected under the CESA, ESA, or other regulations, as well as species considered sufficiently rare by the scientific community to qualify for such listing. For the purposes of this analysis, sensitive species include those listed below.

- Species listed or proposed for listing as threatened or endangered under ESA (50 CFR 17.12 [listed plants] and various notices in the *Federal Register* [proposed species]).
- Species that are candidates for possible future listing as threatened or endangered under ESA (79 Federal Register 72450 December 5, 2014).
- Species listed or proposed for listing by the State of California as threatened or endangered under CESA (14 CCR 670.5).
- Species that meet the definitions of rare or endangered under the State CEQA Guidelines Section 15380.
- Animals that are identified as California species of special concern or fully protected species on California Department of Fish and Game's Special Animals List (California Department of Fish and Game 2011).
- Plants listed as rare under the California Native Plant Protection Act (CNPPA) (CFGF Section 1900 et seq.).
- Plants considered by the California Native Plant Society (CNPS) to be "rare, threatened, or endangered in California" (Lists 1B and 2, California Native Plant Society 2015).
- Plants listed by CNPS as plants about which more information is needed to determine their status and plants of limited distribution (Lists 3 and 4, California Native Plant Society 2015), which may be included as special-status species on the basis of local significance or recent biological information.

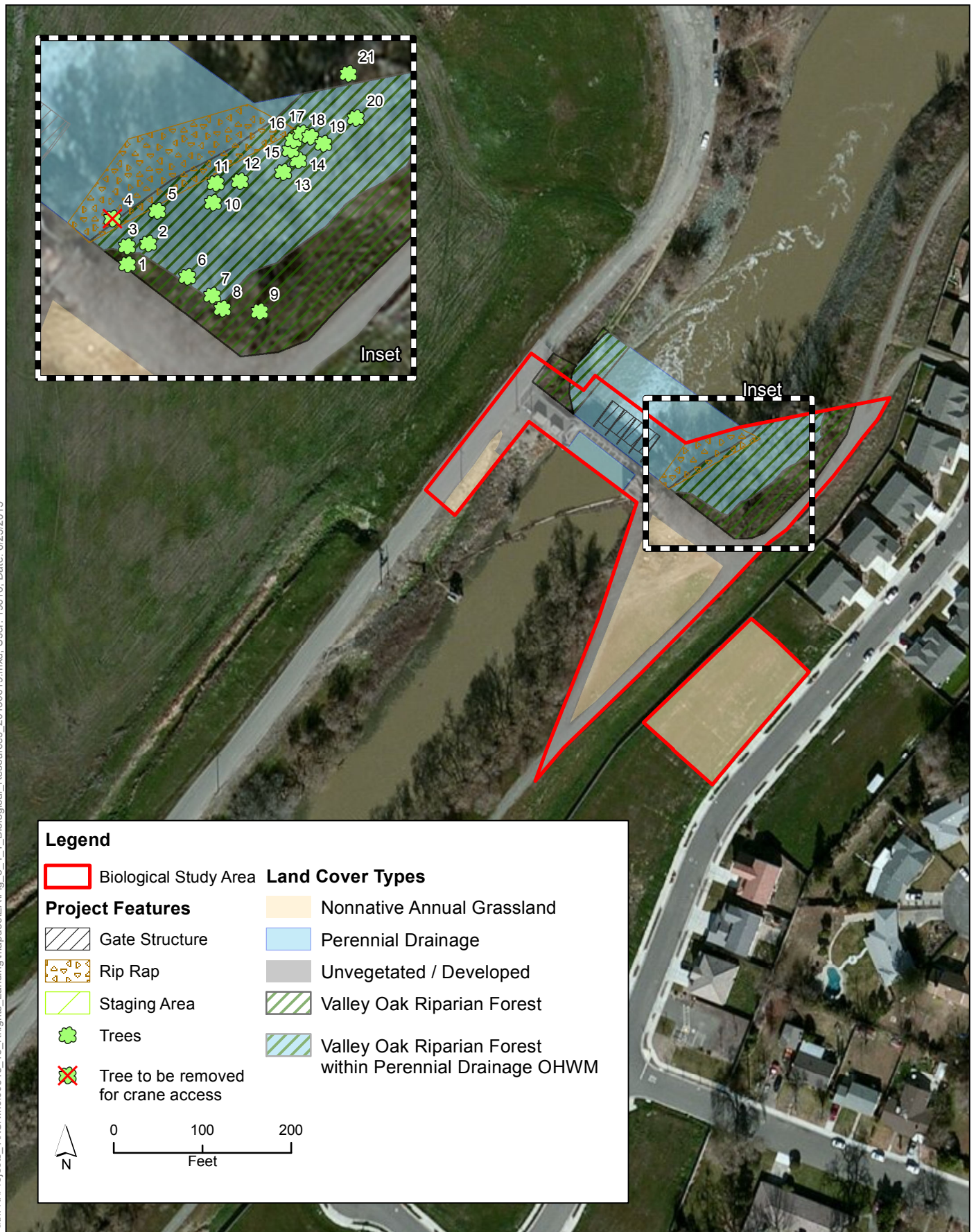


Figure 3.4-1
Effects on Land Cover Types and Trees in the Biological Study Area

Special-Status Plants

Special-status plant species identified with potential to occur in the study area were based on the presence of suitable habitat and microhabitat. Species presumed absent from the study area are those without suitable habitat or microhabitat.

Ten special-status plant species were identified as occurring within a 10-mile radius of the study area (California Natural Diversity Database 2015; California Native Plant Society 2015) (Appendices A and B). The status, distribution, habitat requirements, and identification period of the 10 species are shown in Table 3.4-1.

- Three species occur in habitats that are not present in the study area: woolly rose-mallow and Sanford's arrowhead in freshwater marsh and saline clover in mesic grasslands and vernal pools.
- Seven species have habitat present in the study area, but no suitable microhabitat (alkaline grassland, adobe clay soils, alkaline riparian forest) and/or the habitat is too disturbed by riprap or cultivation: alkali milk-vetch, brittlescale, San Joaquin spearscale, palmate-bracted bird's-beak, Heckard's pepper-grass, woolly-headed lessingia, and Wright's trichocoronis.

Blooming-period surveys have not been conducted in the study area to verify presence or absence of special-status plants; however, the lack of suitable habitat in the study area makes presence of special-status plants very unlikely.

Table 3.4-1. Special-Status Plants with Potential to Occur in the Vicinity of the Study Area

Common and Scientific Name	Legal Status ^a Federal/ State/CNPS	Geographic Distribution	Habitat Requirements	Identification Period	Potential for Occurrence in Study Area
Alkali milk vetch <i>Astragalus tener</i> var. <i>tener</i>	-/-/1B.2	Southern Sacramento Valley, northern San Joaquin Valley, eastern San Francisco Bay	Playas, on adobe clay in valley and foothill grassland, vernal pools on alkali soils; below 197 feet	Mar–Jun	Habitat present in nonnative annual grassland but suitable microhabitat (adobe clay) is not present. Nearest recorded occurrence is ~10.5 miles south of the study area.
Brittlescale <i>Atriplex depressa</i>	-/-/1B.2	Western and eastern Central Valley and adjacent foothills on west side of Central Valley	Alkaline or clay soils in chenopod scrub, meadows and seeps, playas, valley and foothill grassland, vernal pools; below 1,050 feet	Apr–Oct	Habitat present in nonnative annual grassland but no suitable microhabitat (alkaline soils) is present. Nearest recorded occurrence is ~7.5 miles south of the study area.
San Joaquin spearscale <i>Atriplex joaquiniana</i>	-/-/1B.2	Western edge of the Central Valley from Glenn to Tulare Counties	Alkaline soils in chenopod scrub, meadows and seeps, playas, valley and foothill grassland; below 2,739 feet	Apr–Oct	Habitat present in nonnative annual grassland but no suitable microhabitat (alkaline soils) is present. Nearest recorded occurrence is ~10 miles south of the study area.
Palmate-bracted bird's-beak <i>Chloropyron palmatum</i> [<i>Cordylanthus palmatus</i>]	E/E/1B.1	Livermore Valley and scattered locations in the Central Valley from Colusa to Fresno Counties	Alkaline grassland, alkali meadow, chenopod scrub 50–1,670 feet	May–Oct	Habitat present in nonnative annual grassland but no suitable microhabitat (alkaline soils) is present. Nearest recorded occurrence is ~7.5 miles south of the study area.
Rose-mallow <i>Hibiscus lasiocarpus</i> var. <i>occidentalis</i>	-/-/1B.2	Central and southern Sacramento Valley, deltaic Central Valley, and elsewhere in the U.S.	Freshwater marsh along rivers and sloughs; below 394 feet	Jun–Sep	Nearest marsh habitat is in Sycamore Slough, which is 200 feet outside of the proposed action disturbance area. Nearest recorded occurrence is ~4 miles southwest of the study area. No special-status species surveys have been conducted.

Common and Scientific Name	Legal Status ^a Federal/ State/CNPS	Geographic Distribution	Habitat Requirements	Identification Period	Potential for Occurrence in Study Area
Heckard's pepper-grass <i>Lepidium latipes</i> var. <i>heckardii</i>	-/-/1B.2	Southern Sacramento Valley	Alkaline flats in valley and foothill grassland; 32–656 feet	Mar–May	Habitat present in nonnative annual grassland but no suitable microhabitat (alkaline soils) is present. Nearest recorded occurrence is approximately 8.5 miles west of the study area.
Woolly-headed lessingia <i>Lessingia holoeuca</i>	-/-/3	Southern north Coast Ranges, southern Sacramento Valley, northern San Francisco Bay region, Alameda, Monterey, Marin, Napa, Santa Clara, San Mateo, Solano, Sonoma, and Yolo Counties	Clay or serpentinite soils of broadleafed upland forest, coastal scrub, lower montane coniferous forest, valley and foothill grassland; 50–1,000 feet	Jun–Oct	No suitable habitat in area within the Sacramento clay soil map unit, due to on-going cultivation and discing. Nearest recorded occurrence is an historic occurrence ~9 miles southwest of the study area near Woodland. No special-status species surveys have been conducted.
Sanford's arrowhead <i>Sagittaria sanfordii</i>	-/-/1B.2	Scattered locations in Central Valley and Coast Ranges from Del Norte to Fresno Counties	Freshwater marshes, sloughs, canals, and other slow-moving water habitats; below 2,132 feet	May–Oct	Nearest marsh habitat is in Sycamore Slough, which is outside of the proposed action disturbance area. Nearest recorded occurrence is ~15.5 miles northeast of the study area. No special-status species surveys have been conducted.
Wright's trichocoronis <i>Trichocoronis wrightii</i> var. <i>wrightii</i>	-/-/2B.1	Scattered locations in the Central Valley and Southern Coast; Texas	On alkaline soils in floodplains, meadows and seeps, marshes and swamps, riparian forest, vernal pools; 15–1,425 feet	May–Sep	Marginal habitat present in riparian area but no suitable microhabitat (alkaline soils) is present. Nearest recorded occurrence is ~14 miles northwest of the study area.

Common and Scientific Name	Legal Status ^a Federal/ State/CNPS	Geographic Distribution	Habitat Requirements	Identification Period	Potential for Occurrence in Study Area
Saline clover <i>Trifolium hydrophilum</i>	-/-/1B.2	Sacramento Valley, central western California	Salt marsh, mesic alkaline areas in valley and foothill grasslands, vernal pools, marshes and swamps; below 1,000 feet	Apr–Jun	No wetland habitat present in study area. Nearest recorded occurrence is ~10.8 miles south of the study area.

Sources: California Native Plant Society 2015; California Natural Diversity Database 2015; Consortium of California Herbaria 2015.

^a Status explanations:

Federal

E = listed as endangered under the Federal Endangered Species Act.

– = no listing.

State

E = listed as endangered under the California Endangered Species Act.

– = no listing.

CNPS California Rare Plant Rank

1B = List 1B species: rare, threatened, or endangered in California and elsewhere.

2B = List 2B species: rare, threatened, or endangered in California but more common elsewhere.

3 = List 3 species: more information is needed about this plant.

0.1 = seriously endangered in California.

0.2 = fairly endangered in California.

Special-Status Wildlife

Of the 29 special-status wildlife species listed in Table 3.4-2, 7 species were eliminated from further consideration because suitable habitat for these species is not present in the study area or because the species range does not extend into the study area. A brief explanation for the absence of these species is included in Table 3.4-2. The remaining 23 species were determined to have low to high potential to occur in the study area on the basis of existing habitat conditions observed during the field surveys. No special-status wildlife species were observed during the 2015 field survey conducted for the proposed action.

In addition to special-status species, non-special-status migratory birds and raptors could nest in or adjacent to the study area and their occupied nests and eggs are protected by CFGC Sections 3503 and 3503.5 and the federal Migratory Bird Treaty Act (MBTA).

Table 3.4-2. Special-Status Wildlife with Potential to Occur in the Vicinity of the Study Area

Common and Scientific Names	Status ^a Federal/ State/Other	Geographic Distribution	Habitat Requirements	Potential Occurrence in Biological Study Area
Invertebrates				
Antioch Dunes anthicid beetle <i>Anthicus antiochensis</i>	-/-/-	Population in Antioch Dunes believed extinct. Present in several localities along the Sacramento and Feather Rivers.	Loose sand on sand bars and sand dunes.	Moderate—small amount of potentially suitable habitat present; no occurrences within 5 miles of the study area.
Sacramento anthicid beetle <i>Anthicus sacramento</i>	-/-/-	Dune areas at mouth of Sacramento River; western tip of Grand Island, Sacramento County; upper Putah Creek and dunes near Rio Vista, Solano County; Ord Ferry Bridge, Butte County.	Found in sand slip-faces among willows; associated with riparian and other aquatic habitats.	Moderate—small amount of potentially suitable habitat present; no occurrences within 5 miles of the study area.
Sacramento Valley tiger beetle <i>Cicindela hirticollis abrupta</i>	-/-/-	Lower Sacramento Valley (i.e., Sacramento River, lower American River, and Cache Creek).	Found in sandy areas among willows in riverine and riparian habitats.	Moderate—small amount of potentially suitable habitat present; no occurrences within 5 miles of the study area.
Valley elderberry longhorn beetle <i>Desmocerus californicus dimorphus</i>	T/-/-	Streamside habitats below 3,000 feet throughout the Central Valley.	Riparian and oak savanna habitats with elderberry shrubs; elderberries are the host plant.	None—no suitable habitat (elderberry shrubs) present in or adjacent to the study area.
Vernal pool fairy shrimp <i>Branchinecta lynchi</i>	T/-/-	Central Valley, central and south Coast Ranges from Tehama County to Santa Barbara County. Isolated populations also in Riverside County.	Common in vernal pools; also found in sandstone rock outcrop pools.	None—no suitable habitat present in the study area.
Vernal pool tadpole shrimp <i>Lepidurus packardii</i>	E/-/-	Shasta County south to Merced County.	Vernal pools and ephemeral stock ponds.	None—no suitable habitat present in the study area.

Common and Scientific Names	Status ^a Federal/ State/Other	Geographic Distribution	Habitat Requirements	Potential Occurrence in Biological Study Area
Amphibians				
California tiger salamander <i>Ambystoma californiense</i>	T/T/–	Central Valley, including Sierra Nevada foothills, up to approximately 1,000 feet, and coastal region from Butte County south to northeastern San Luis Obispo County.	Small ponds, lakes, or vernal pools in grasslands and oak woodlands for larvae; rodent burrows, rock crevices, or fallen logs for cover for adults and for summer dormancy.	None—no suitable habitat present. No occurrences within 10 miles of the study area and no suitable breeding ponds are present within 1.24 miles (typical dispersal distance) of the study area.
California red-legged frog <i>Rana draytonii</i>	T/SSC/–	Found along the coast and coastal mountain ranges of California from Marin County to San Diego County and in the Sierra Nevada from Tehama County to Fresno County.	Permanent and semi-permanent aquatic habitats, such as creeks and coldwater ponds, with emergent and submergent vegetation. May estivate in rodent burrows or cracks during dry periods.	None—no suitable habitat present. Species considered extirpated from the valley floor (U.S. Fish and Wildlife Service 2002).
Reptiles				
Western pond turtle <i>Emys marmorata</i>	–/SSC/–	Occurs from the Oregon border of Del Norte and Siskiyou Counties south along the coast to San Francisco Bay, inland through the Sacramento Valley, and on the western slope of Sierra Nevada.	Occupies ponds, marshes, rivers, streams, and irrigation canals with muddy or rocky bottoms and with watercress, cattails, water lilies, or other aquatic vegetation in woodlands, grasslands, and open forests.	Moderate—suitable habitat present in Sycamore Slough, north of the study area; not observed during field reconnaissance survey; one occurrence approximately 8 miles from the study area on the Sacramento River.
Giant garter snake <i>Thamnophis gigas</i>	T/T/–	Central Valley from the vicinity of Burrell in Fresno County north to near Chico in Butte County; has been extirpated from areas south of Fresno.	Sloughs, canals, low gradient streams and freshwater marsh habitats where there is a prey base of small fish and amphibians; also found in irrigation ditches and rice fields; requires grassy banks and emergent vegetation for basking and areas of high ground protected from flooding during winter.	High—suitable upland habitat present; no occurrences in study area but numerous occurrences within 5 miles of the study area, some of which are in water bodies connected to the study area.

Common and Scientific Names	Status ^a Federal/ State/Other	Geographic Distribution	Habitat Requirements	Potential Occurrence in Biological Study Area
Birds				
Great blue heron <i>Ardea Herodias</i>	-/-/CFGF, rookeries (nesting colony)	Year-round range spans most of California except the eastern portion of the State and the highest elevations; winter range expands to include eastern California.	Nests colonially in tall trees; forages in freshwater and saline marshes, shallow open water, and occasionally cropland or low, open upland habitats, such as pastures.	Moderate—suitable nesting and foraging habitat adjacent to the study area; no occurrences within 5 miles of the study area. No rookeries are present in or adjacent to the study area.
Great egret <i>Ardea alba</i>	-/-/CFGF, rookeries (nesting colony)	Year-round range spans the Central Valley, central coast, and portions of southern California; winter range expands to include the remainder of the coast	Nests colonially in tall trees; forages in freshwater and saline marshes, shallow open water, and occasionally cropland or low, open upland habitats, such as pastures.	Moderate—suitable nesting and foraging habitat adjacent to the study area; no occurrences within 5 miles of the study area. No rookeries are present in or adjacent to the study area.
Snowy egret <i>Egretta thula</i>	-/-/CFGF, rookeries (nesting colony)	Year-round range spans the Central Valley, Delta, entire coast, central Coast Ranges, and southeastern California; winter range expands to include northeastern California	Nests colonially in dense marshes and low trees; forages in freshwater and saline marshes, shallow open water, and occasionally irrigated cropland or wet upland habitats.	Moderate—suitable nesting and foraging habitat adjacent to the study area; no occurrences within 5 miles of the study area. No rookeries are present in or adjacent to the study area.
Black-crowned night-heron <i>Nycticorax nycticorax</i>	-/-/CFGF, rookeries (nesting colony)	Year-round range includes much of lowland California	Nests colonially in dense marshes, groves of low trees, and dense shrubs; forages in freshwater and saline marshes and in shallow open water at the edge of marsh vegetation.	Moderate—suitable nesting and foraging habitat adjacent to the study area; no occurrences within 5 miles of the study area. No rookeries are present in or adjacent to the study area.
White-faced ibis <i>Plegadis chihi</i>	-/WL/CFGF, rookeries (nesting colony)	Year-round resident in scattered locations in the Central Valley and southern California; also nests in northeastern California	Forages in wetlands and irrigated or flooded croplands and pastures; breeds colonially in dense freshwater marsh.	Moderate—suitable nesting and foraging habitat adjacent to the study area; no occurrences within 5 miles of the study area. No rookeries are present in or adjacent to the study area.
Merlin <i>Falco columbarius</i>	-/-/WL	Does not breed in California. Winter range encompasses most of California except the highest elevations.	Forages in a wide variety of habitats, but in the Central Valley is most common around agricultural fields and grasslands.	Moderate—suitable foraging habitat in fallow field in and adjacent to the study area; no occurrences within 5 miles of the study area.

Common and Scientific Names	Status ^a Federal/ State/Other	Geographic Distribution	Habitat Requirements	Potential Occurrence in Biological Study Area
Swainson's hawk <i>Buteo swainsoni</i>	-/T/-	Lower Sacramento and San Joaquin Valleys, the Klamath Basin, and Butte Valley. Highest nesting densities occur near Davis and Woodland, Yolo County.	Nests in oaks or cottonwoods in or near riparian habitats. Forages in grasslands, irrigated pastures, and grain fields.	High—suitable nesting and foraging habitat; two occurrences within 1 mile of the study area.
Western snowy plover <i>Charadrius alexandrinus nivosus</i>	T/-/SSC	Breeds in coastal California and near alkali lakes in eastern California and remnant alkali playas in the southern San Joaquin Valley	Nests and forages on sandy and gravelly beaches along the coast and the shores of inland alkali lakes.	None—no suitable habitat in the study area
Mountain plover <i>Charadrius montanus</i>	-/-/SSC	Does not breed in California. Winter range spans the western Central Valley, including areas of the Delta east of Suisun Marsh, and portions of southern California.	Forages in short grasslands and plowed agricultural fields where vegetation is sparse and trees are absent.	Moderate—suitable winter foraging habitat in and adjacent to the study area.
Western yellow-billed cuckoo <i>Coccyzus americanus</i>	T/E/-	Nests along the upper Sacramento, lower Feather, south fork of the Kern, Amargosa, Santa Ana, and Colorado Rivers.	Wide, dense riparian forests with a thick understory of willows for nesting; Large patch sizes (20–40 hectares [49–99 acres], with a minimum width of 100 meters [328 feet]), are typically required for cuckoo occupancy (Laymon 1998; Riparian Habitat Joint Venture 2004). Sites with a dominant cottonwood overstory are preferred for foraging; may avoid valley-oak riparian habitats where scrub jays are abundant.	Low—riparian trees are not of sufficient patch size to support cuckoos (0.15 hectares); nearest occurrence approximately 8 miles from the study area.
Western burrowing owl <i>Athene cunicularia hypogeia</i>	-/SSC/-	Lowlands throughout California, including the Central Valley, northeastern plateau, southeastern deserts, and coastal areas. Rare along south coast.	Level, open, dry, heavily grazed or low-stature grassland or desert vegetation with available burrows.	Low—suitable foraging habitat; no suitable nesting habitat; no occurrences in the study area. Nearest occurrence approximately 9 miles from the study area.

Common and Scientific Names	Status ^a Federal/ State/Other	Geographic Distribution	Habitat Requirements	Potential Occurrence in Biological Study Area
Bank swallow <i>Riparia riparia</i>	–/T/–	Occurs along the Sacramento River from Tehama County to Sacramento County, along the Feather and lower American Rivers, in the Owens Valley, and in the plains east of the Cascade Range in Modoc, Lassen, and northern Siskiyou Counties. Small populations near the coast from San Francisco County to Monterey County.	Nests in bluffs or banks, usually adjacent to water, where the soil consists of sand or sandy loam.	Low—no suitable nesting habitat in the study area
Tricolored blackbird <i>Agelaius tricolor</i>	–/E/–	Permanent resident in the Central Valley from Butte County to Kern County; breeds at scattered coastal locations from Marin County south to San Diego County and at scattered locations in Lake, Sonoma, and Solano Counties; rare nester in Siskiyou, Modoc, and Lassen Counties.	Nests in dense colonies in emergent marsh vegetation, such as tules and cattails, or upland sites with blackberries, nettles, thistles, and grain fields; habitat must be large enough to support 50 pairs; probably requires water at or near the nesting colony.	Moderate—suitable foraging habitat present; no suitable nesting habitat present in the study area; two colonies within 3 miles of the study area.
Song sparrow (“Modesto” population) <i>Melospiza melodia</i>	–/–/SSC	Year-round range includes the Delta east of Suisun Marsh, the Sacramento Valley, and the northern San Joaquin Valley	Nests and forages primarily in emergent marsh, riparian scrub, and early successional riparian forest habitats, and infrequently in mature riparian forest and sparsely vegetated ditches and levees.	High—suitable nesting and foraging habitat in riparian and emergent vegetation in and adjacent to the study area; no occurrences within 5 miles of the study area.
Mammals				
Western red bat <i>Lasiurus blossevillei</i>	–/SSC/ WBWG: High priority	Scattered throughout much of California at lower elevations.	Found primarily in riparian and wooded habitats. Occurs at least seasonally in urban areas. Day roosts in trees in the foliage. Found in fruit orchards and sycamore riparian habitats in the Central Valley.	Moderate—suitable roosting and foraging habitat; there is one occurrence within 1 mile of the study area.

Common and Scientific Names	Status ^a Federal/ State/Other	Geographic Distribution	Habitat Requirements	Potential Occurrence in Biological Study Area
Hoary bat <i>Lasiurus cinereus</i>	-/-/ WBWG: Moderate priority	Occurs throughout California from sea level to 13,200 feet.	Found primarily in forested habitats. Also found in riparian areas and in park and garden settings in urban areas. Day roosts in foliage of trees.	Moderate—suitable roosting and foraging habitat; there is one occurrence within 1 mile of the study area
Silver-haired bat <i>Lasionycteris noctivagans</i>	-/-/WBWG: Moderate priority	Found from the Oregon border south along the coast to San Francisco Bay and along the Sierra Nevada and Great Basin region to Inyo County. Also occurs in southern California from Ventura and San Bernardino Counties south to Mexico. Has been recorded in Sacramento, Stanislaus, Monterey, and Yolo Counties.	During spring and fall migrations, may be found anywhere in California. Summer habitats include coastal and montane coniferous forests, valley foothill woodlands, pinyon-juniper woodlands, and valley foothill and montane riparian habitats. Roosts in hollow trees, snags, buildings, rock crevices, caves, and under bark.	Moderate—suitable roosting and foraging habitat; no occurrences have been recorded within 5 miles of the study area (possibly due to the lack of bat surveys in this area).
Pallid bat <i>Antrozous pallidus</i>	-/SSC/ WBWG: High priority	Occurs throughout California, except the high Sierra, from Shasta to Kern County and the northwest coast, primarily at lower and mid elevations.	Occurs in a variety of habitats from desert to coniferous forest. Most closely associated with oak, yellow pine, redwood, and giant sequoia habitats in northern California and oak woodland, grassland, and desert scrub in southern California. Relies heavily on trees for roosts.	Moderate—suitable roosting and foraging habitat; no occurrences have been recorded within 5 miles of the study area (possibly due to the lack of bat surveys in this area).

Common and Scientific Names	Status ^a Federal/ State/Other	Geographic Distribution	Habitat Requirements	Potential Occurrence in Biological Study Area
American badger <i>Taxidea taxus</i>	–/SSC	In California, occur throughout the state except in humid coastal forests of northwestern California in Del Norte and Humboldt Counties.	Wide variety of open, arid habitats but most commonly associated with grasslands, savannas, mountain meadows, and open areas of desert scrub; the principal habitat requirements for the species appear to be sufficient food (burrowing rodents), friable soils, and relatively open, uncultivated ground.	None— no suitable habitat in the study area.

^a Status explanations:

Federal

E = listed as endangered under the Federal Endangered Species Act.

T = listed as threatened under the Federal Endangered Species Act.

C = candidate species for which U.S. Fish and Wildlife Service has on file sufficient information on biological vulnerability and threat(s) to support issuance of a proposed rule to list, but issuance of the proposed rule is precluded.

– = no listing.

State

E = listed as endangered under the California Endangered Species Act.

T = listed as threatened under the California Endangered Species Act.

FP = fully protected under the California Fish and Game Code.

SSC = species of special concern in California.

– = no listing.

Other

WBWG = Western Bat Working Group 2007. Available: <http://www.wbwg.org/spp_matrix.html>.

Moderate priority = species status is unclear because of a lack of data; this designation indicates a level of concern that should warrant (1) closer evaluation and more research of the species and possible threats and (2) conservation actions benefiting the species.

High priority = species are imperiled or at high risk of imperilment.

Special-Status Fish

Eight special-status fish species have the potential to occur in the action area determined by their critical habitat and life histories of the species. The potential to occur within the action area was rated high for all species, although the extent of occurrence depends on the timing of fish presence in the action area; and their ability to successfully avoid the affected areas.

Table 3.4-3. Special-Status Fish with Potential to Occur in the Vicinity of the Study Area

Common and Scientific Name	Legal Status ^a Federal/ State	Geographic Distribution	Habitat Requirements	Potential for Occurrence in Study Area
Chinook salmon—winter-run <i>Oncorhynchus tshawytscha</i>	E/E	Adults occur in the main-stem Sacramento River from Keswick Dam to Red Bluff Diversion Dam. Juveniles occur from the Upper Sacramento River through the Delta and the SF Estuary.	Occurs in well-oxygenated, cool, riverine habitat with water temperatures from 8.0 to 12.5°C. Habitat types are riffles, runs, and pools (Moyle 2002).	High—during adult migration and juvenile rearing/migration.
Chinook salmon—spring-run <i>Oncorhynchus tshawytscha</i>	T/T	The Sacramento River, Feather River, Yuba River, Butte Creek, Mill Creek, Deer Creek, Antelope Creek, Battle Creek, Clear Creek, and Beegum Creek tributary to Cottonwood Creek.	Occurs in tributaries of the Sacramento River that maintain well-oxygenated, cool, riverine habitat with water temperatures from 8.0 to 12.5°C. Habitat types are riffles, runs, and pools (Moyle 2002).	High—during adult migration and juvenile rearing/migration.
Chinook salmon—fall and late fall-run <i>Oncorhynchus tshawytscha</i>	SSC/–	The main stem Sacramento River and tributaries. The San Joaquin River tributaries.	Occurs in streams and rivers within the Sacramento and San Joaquin River drainage that well-oxygenated, cool, riverine habitat with water temperatures from 8.0 to 12.5°C. Habitat types are riffles, runs, and pools (Moyle 2002).	High—during adult migration into Sacramento River and tributaries.
Steelhead—Central Valley DPS <i>Oncorhynchus mykiss</i>	T/–	Riverine and stream habitat within the Sacramento-San Joaquin River drainages that contain suitable habitat needed for steelhead survival.	Occurs in streams and rivers within the Sacramento River drainage that are well-oxygenated, cool, riverine habitat with water temperatures from 7.8 to 18°C (Moyle 2002). Habitat types are riffles, runs, and pools.	High—during adult migration and juvenile rearing/migration.

Common and Scientific Name	Legal Status ^a Federal/ State	Geographic Distribution	Habitat Requirements	Potential for Occurrence in Study Area
Green sturgeon (Southern DPS) <i>Acipenser medirostris</i>	T/SSC	The Sacramento River, the Yolo and Sutter bypasses, the lower Feather River, and the lower Yuba River. The lower San Joaquin River and the Delta. SF Estuary and coastal waters.	Habitat that is free of migratory obstructions, with water quantity and quality that support migratory movements, enhance juvenile growth and provide cover. Need well-oxygenated water, with temperatures from 8.0 to 14°C.	High—during adult migration and juvenile rearing/migration.
Sacramento Splittail <i>Pogonichthys macrolipidotus</i>	–/SSC	The Sacramento river, sloughs, backwaters and oxbow lakes to RBDD.	Backwater habitat that is shallow, low velocity, suitable temperature, and food availability.	High—during adult migration and juvenile rearing/migration.
River lamprey <i>Lampetra ayresi</i>	–/SSC	Sacramento, San Joaquin, and Napa Rivers; tributaries of San Francisco Bay (Moyle 2002; Moyle et al. 1995).	Adults live in the SF Estuary and migrate into fresh water to spawn.	High—during adult migration and juvenile rearing/migration.
Hardhead <i>Mylopharodon conocephalus</i>	–/SSC	Sacramento, San Joaquin, and Russian Rivers and tributaries (Moyle 2002; Moyle et al. 1995).	Typically occur in undisturbed, low- to mid-elevation streams and main stem Sacramento River and tributaries.	High. Encountered in Glenn Colusa Irrigation District sampling upstream of site area.

DPS = distinct population segment.

Status explanations:

Federal

E = listed as endangered under the Federal Endangered Species Act.

T = listed as threatened under the Federal Endangered Species Act.

C = candidate for listing as threatened or endangered under the Federal Endangered Species Act.

– = no listing.

State

E = listed as endangered under the California Endangered Species Act.

T = listed as threatened under the California Endangered Species Act.

FP = fully protected under the California Fish and Game Code.

SSC = species of special concern in California.

– = no listing.

Waters of the United States, Including Wetlands

The CBD is a water of the United States. No wetlands were identified in the study area. A preliminary delineation of the OHWM of the CBD was conducted on January 23, 2015, and submitted in a letter to the USACE on May 7, 2015, in support of a preliminary jurisdictional determination.

3.4.3 Regulatory Setting

3.4.3.1 Federal

The following federal regulations related to biological resources apply to implementation of the proposed action.

Federal Endangered Species Act

The ESA protects fish and wildlife species and their habitats that have been identified by the NMFS or U.S. Fish and Wildlife Service (USFWS) as threatened or endangered. *Endangered* refers to species, subspecies, or DPSs that are in danger of extinction through all or a significant portion of their range. *Threatened* refers to species, subspecies, or DPSs that are likely to become endangered in the near future.

The ESA is administered by USFWS and NMFS. In general, NMFS is responsible for protection of ESA-listed marine species and anadromous fish, and USFWS is responsible for other listed species. Provisions of Sections 7 and 9 of the ESA are relevant to this proposed action and summarized below.

Section 7: Endangered Species Act Authorization Process for Federal Actions

Section 7 of the ESA provides a means for authorizing take of threatened and endangered species by federal agencies. Under Section 7, the federal agency conducting, funding, or permitting an action (for this action, USACE) must consult with NMFS or USFWS, as appropriate, to ensure that the proposed action would not jeopardize endangered or threatened species or destroy or adversely modify designated critical habitat. The study area supports potential habitat for federally listed giant garter snake, Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, Central Valley steelhead, and southern DPS green sturgeon that could be adversely affected by the proposed action. Therefore, the proposed action has the potential to result in take of a federally listed species and consultation would be initiated with NMFS and USFWS.

Section 9: Endangered Species Act Prohibitions

Section 9 of the ESA prohibits the take of any fish or wildlife species listed under ESA as endangered. Take of threatened species also is prohibited under Section 9, unless otherwise authorized by federal regulations.¹ *Take*, as defined by ESA, means “to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.” *Harm* is defined as “any act that kills or injures the species, including significant habitat modification.” In addition, Section 9

¹ In some cases, exceptions may be made for threatened species under ESA Section 4(d); in such cases, USFWS or NMFS issues a “4(d) rule” describing protections for the threatened species and specifying the circumstances under which take is allowed.

prohibits removing, digging up, cutting, and maliciously damaging or destroying federally listed plants on sites under federal jurisdiction.

Critical Habitat

Critical habitat, as defined in ESA Section 3, is the specific area within the geographic area occupied by a species, at the time it is listed in accordance with ESA, on which are found those biological features essential to the conservation of the species, and may require special management considerations or protection. It also includes specific areas outside the geographic area occupied by a species at the time it is listed, upon a determination that such areas are essential for the conservation of the species. No critical habitat has been designated for the giant garter snake. The study area is within the critical habitat designated for Central Valley steelhead, Central Valley spring-run chinook salmon, Sacramento River winter-run chinook salmon, and southern DPS green sturgeon.

Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act requires all Federal agencies to consult with NMFS regarding all actions or proposed actions permitted, funded, or undertaken that may adversely affect essential fish habitat (EFH). EFH is defined as “waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity.”

Migratory Bird Treaty Act

The MBTA (16 USC 703) enacts the provisions of treaties between the United States, Great Britain, Mexico, Japan, and the Soviet Union (now Russia). The MBTA prohibits the take, possession, import, export, transport, selling, purchase, barter, or offering for sale, purchase, or barter any migratory bird, their eggs, parts, and nests, except as authorized under a valid permit (50 CFR 21.11). Executive Order 13186 (January 10, 2001) directs each federal agency taking actions that have or may have a negative effect on migratory bird populations to work with USFWS to develop a memorandum of understanding that will promote the conservation of migratory bird populations. The study area supports known migratory bird nests and potential nesting habitat that could be affected by implementation of the proposed action.

Clean Water Act

The CWA was enacted as an amendment to the federal Water Pollution Control Act of 1972, which outlined the basic structure for regulating discharges of pollutants to waters of the United States. The CWA serves as the primary federal law protecting the quality of the nation’s surface waters, including lakes, rivers, and coastal wetlands.

The CWA empowers the EPA to set national water-quality standards and effluent limitations and includes programs addressing both point-source and non-point-source pollution. *Point-source pollution* is pollution that originates or enters surface waters at a single, discrete location, such as an outfall structure or an excavation or construction site. *Non-point-source pollution* originates over a broader area and includes urban contaminants in stormwater runoff and sediment loading from upstream areas. The CWA operates on the principle that all discharges into the nation’s waters are unlawful unless specifically authorized by a permit; permit review is the CWA’s primary regulatory tool. The following sections provide additional details on pertinent sections of the CWA.

Section 404 of the Clean Water Act

USACE and EPA regulate the discharge of dredged and fill material into “waters of the United States” under Section 404 of the CWA. USACE’s jurisdiction over nontidal waters of the United States extends to the OHWM, provided the jurisdiction is not extended by the presence of wetlands (33 CFR Part 328 Section 328.4). The OHWM is defined in the federal regulations as follows.

[T]hat line on the shore established by the fluctuations of water and indicated by physical characteristics such as clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas. (33 CFR Part 328 Section 328.3[e].)

USACE typically will exert jurisdiction over that portion of the study area that contains waters of the United States and adjacent wetlands. This jurisdiction equals approximately the bank-to-bank portion of a creek along its entire length up to the OHWM and adjacent wetlands areas that would be directly or indirectly adversely affected by the proposed action. The OHWM area of the CBD is under USACE jurisdiction, and placement of proposed action structures and erosion control within the OHWM would require a CWA Section 404 permit.

Section 401 of the Clean Water Act

Under CWA Section 401, applicants for a federal license or permit to conduct activities that might result in the discharge of a pollutant into waters of the United States must obtain certification from the state in which the discharge would originate or, if appropriate, from the interstate water pollution control agency with jurisdiction over affected waters at the point where the discharge would originate. A CWA Section 401 water quality certification from the Central Valley Regional Water Board would be required for construction in the CBD.

3.4.3.2 State

The following state regulations related to biological resources apply to CVFPB and RD 108’s implementation, construction, operation, and maintenance of the proposed action.

California Endangered Species Act

CESA (CFGF Sections 2050 through 2116) states that all native species or subspecies of a fish, amphibian, reptile, mammal, or plant and their habitats that are threatened with extinction and those experiencing a significant decline that, if not halted, would lead to a threatened or endangered designation will be protected or preserved.

Under Section 2081 of the CFGF, a permit from CDFW is required for actions that could result in the take of a species that is state-listed as threatened or endangered. Under CESA, *take* is defined as an activity that would directly or indirectly kill an individual of a species. The definition does not include *harm* or *harass*, as the definition of take under ESA does. As a result, the threshold for take under CESA is higher than that under ESA. For example, habitat modification is not necessarily considered take under CESA.

Section 2090 of CFGF requires state agencies to comply with endangered species protection and recovery and to promote conservation of these species. CDFW administers the act and authorizes take through CFGF Section 2081 incidental take agreements (except for species designated as fully protected) and Section 2080.1 consistency determinations. If it is determined that the proposed

action will result in take of a state-listed species, an incidental take permit or consistency determination will be obtained through consultation with CDFW. The study area supports state listed Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, and potential nesting habitat for the state-listed Swainson's hawk.

For Swainson's hawks, CDFW has developed survey guidance, conservation strategies, and best practices for avoiding, minimizing, and mitigating action impacts on the species. The most recent guidance published by CDFW is the *Swainson's Hawk Survey Protocols, Impact Avoidance, and Minimization Measures for Renewable Energy Projects in the Antelope Valley of Los Angeles and Kern Counties, California* (California Energy Commission and California Department of Fish and Game 2010). Although this guidance is not specific to the action area, it provides the most up-to-date information on Swainson's hawk survey recommendations and protection measures.

California Fully Protected Species

CFGC Sections 3511, 3513, 4700, and 5050 pertain to fully protected wildlife species (birds in Sections 3511 and 3513, mammals in Section 4700, and reptiles and amphibians in Section 5050) and strictly prohibit the take of these species. CDFW cannot issue a take permit for fully protected species, except under narrow conditions for scientific research or the protection of livestock, or if a Natural Community Conservation Plan (NCCP) has been adopted. The study area supports potential nesting habitat for the fully protected white-tailed kite that could be affected by implementation of the proposed action.

Sections 3503, 3503.5, and 3513 of the California Fish and Game Code

CFGC Sections 3503, 3503.5, and 3513 protect all native birds, birds of prey, and all nongame birds, including eggs and nests, that are not already listed as fully protected and that occur naturally within the state. Eggs and nests of all birds are protected under Section 3503, while Section 3503.5 protects all birds of prey as well as their eggs and nests. Migratory non-game birds are protected under Section 3513. Except for take related to scientific research, take as described above is prohibited. Many bird species potentially could nest in the action area or vicinity. These birds, their nests, and eggs would be protected under these sections of the CFGC. The study area supports known bird nests and potential nesting habitat that could be affected by implementation of the proposed action.

California Native Plant Protection Act

CESA defers to the CNPPA to ensure that state-listed plant species are protected when state agencies are involved in actions subject to CEQA. Plants listed as rare under CNPPA are not protected under CESA but rather under CEQA. One state-listed endangered species, palmate-bracted bird's-beak, occurs in the proposed action region.

Sections 1600–1603 of the California Fish and Game Code

CFGC Sections 1600–1603 state that it is unlawful for any person or agency to substantially divert or obstruct the natural flow or substantially change the bed, channel, or bank of any river, stream, or lake in California that supports wildlife resources, or to use any material from the streambeds, without first notifying CDFW. A Lake and Streambed Alteration Agreement must be obtained if effects are expected to occur. The regulatory definition of a stream is a body of water that flows at least periodically or intermittently through a bed or channel having banks, and that supports

wildlife, fish, or other aquatic life. This definition includes watercourses having a surface or subsurface flow that supports or has supported riparian vegetation. CDFW's jurisdiction within altered or artificial waterways is based on the value of those waterways to fish and wildlife extending to the tops of banks and often including the outer edge of riparian vegetation canopy cover. The CBD and associated riparian habitat within the study area are within CDFW jurisdiction, and construction activities in the CBD and riparian habitat would require a Section 1602 streambed alteration agreement.

Porter-Cologne Water Quality Control Act

Under the Porter-Cologne Water Quality Control Act, the State of California, through the Regional Water Boards, regulates discharges of waste into any waters of the state, regardless of whether USACE has concurrent jurisdiction under CWA Section 404. *Waters of the state* include all surface water or groundwater within the state. The CBD is a water of the state that would be affected by implementation of the proposed action. Because the CBD is also a water of the United States, regulation by the Regional Water Board would occur under CWA Section 401, as described above.

3.4.3.3 Local

The following local policies related to biological resources apply to CVFPB and RD 108's implementation, construction, operation, and maintenance of the proposed action.

Yolo County 2030 Countywide General Plan

The Conservation Element of Yolo County's *2030 Countywide General Plan* (Yolo County 2009) includes policies to protect biological resources in the study area. These policies include preservation and restoration of open space, native vegetation and plant communities, ecological functions in the watershed, wildlife movement corridors, and special-status species. The proposed action would be in compliance with Yolo County policies.

Draft Yolo County Natural Heritage Program

The draft Yolo County Natural Heritage Program is a countywide NCCP/habitat conservation plan (HCP) to conserve the natural open space and agricultural landscapes that provide habitat for many special-status species in the county (Yolo County Natural Heritage Program 2009). The Yolo County Natural Heritage Program will describe the measures that will be undertaken to conserve important biological resources and obtain permits for urban growth and public infrastructure projects. The study area supports important biological resources to be conserved under the NCCP/HCP that would be affected by implementation of the proposed action. Proposed action effects on special-status species should be evaluated with consideration of measures in the draft NCCP/HCP.

Yolo County Habitat Conservation Joint Powers Agency

The Yolo County Habitat Conservation Joint Powers Agency (JPA) was formed in August 2002 for the purpose of acquiring habitat conservation easements and to serve as the lead agency for the preparation of a NCCP/HCP for Yolo County and the Cities of Davis, Woodland, Winters, and West Sacramento. The JPA is responsible for the facilitation of mitigation for effects on foraging habitat of the state-threatened Swainson's hawk by assisting in the acquisition of conservation easements. The JPA and CDFW have entered into an *Agreement Regarding Mitigation for Impacts to Swainson's Hawk Foraging Habitat in Yolo County* (Mitigation Agreement).

The Mitigation Agreement allows for the establishment of a mitigation fee program to fund the acquisition, enhancement, and long-term management of Swainson's hawk foraging habitat conservation lands. As of January 2006, the JPA has issued a Revised Swainson's Hawk Interim Mitigation Fee Program that requires a 1:1 compensation ratio (1 acre of Swainson's hawk foraging habitat preserved for every 1 acre of foraging habitat lost). Projects of fewer than 40 acres could contribute to a fund for purchase of suitable conservation lands. Projects of more than 40 acres would require the developer, in coordination with the JPA, to locate and negotiate a conservation easement on an appropriate property that would contribute to the JPA's preserve design. The Mitigation Agreement does not authorize the incidental take of Swainson's hawk.

3.4.4 Methods

The methods used to identify biological resources consisted of a prefield investigation and field survey. These methods and additional information obtained for the study area are described below.

3.4.1.1 Prefield Investigation

Prior to conducting the site visits for the proposed action, ICF International biologists reviewed information pertaining to vegetation and wetland resources in the action area or vicinity from the following sources.

- A search of the CNPS online Inventory of Rare and Endangered Plants of California for the 7.5-minute Knights Landing, Taylor Monument, Grays Bend, Eldorado Bend, Kirkville, Woodland, Verona, Nicolaus, and Sutter Causeway quadrangles (California Native Plant Society 2015) (Appendix A).
- A CNDDDB records search of the USGS 7.5-minute Knights Landing, Taylor Monument, Grays Bend, Eldorado Bend, Kirkville, Woodland, Verona, Nicolaus, and Sutter Causeway quadrangles (California Natural Diversity Database 2015) (Appendix B).
- USFWS list of endangered, threatened, and proposed species for the USGS 7.5-minute Knights Landing quadrangle and Yolo County obtained from the USFWS web site (U.S. Fish and Wildlife Service 2015) (Appendix C).

3.4.1.2 Field Surveys

An ICF International wildlife biologist and botanist/wetland ecologist conducted a reconnaissance-level site visit on January 27, 2015, to document existing conditions within the study area, including the land cover types, including waters of the United States; wildlife habitats; and trees.

3.4.5 Significance Criteria

For this analysis, an environmental effect was significant related to biological resources if it would result in any of the effects listed below. These effects are based on NEPA standards and standards of professional practice.

- Substantially and adversely affect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW or USFWS.

- Substantially and adversely affect any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by CDFW or USFWS.
- Substantially affect federally protected wetlands as defined by Section 404 of the CWA (including, but not limited to, marshes, vernal pools, coastal wetlands, etc.) through direct removal, filling, hydrological interruption, or other means.

3.4.6 Environmental Consequences

3.4.6.1 No Action

Under the No Action alternative, the proposed action would not be constructed, and there would be no adverse effects valley oak riparian forest, perennial stream, or special-status plant and wildlife species. Special-status fish species would be adversely affected by the continuing take of special-status fish species that move through the radial gates of the KLOG and are lost to their populations from entrapment in the CBD above the structure. This would be an adverse effect on salmonid populations, as the potential for loss would keep occurring on an annual basis for the foreseeable future.

3.4.6.2 Proposed Action

Implementation of the proposed action would result in the following effects on biological resources.

Effect BIO-1: Loss of Foraging and Nesting Habitat for Swainson's Hawk and other Migratory Birds and Raptors (less than significant with mitigation)

The study area supports riparian vegetation and large trees that could provide nesting habitat for birds and raptors including the state-listed Swainson's hawk. If proposed action construction occurs during the breeding season (generally February 15 through August 30), then tree trimming and removal, increased noise, and ground disturbance from large equipment could result in the removal of active nests, abandonment of an active nest, or forced fledging of young. This effect is potentially significant because it could result in an appreciable reduction in the reproductive success of a sensitive species (i.e. Swainson's hawk). The proposed action will not affect nesting migratory birds and raptors based on a construction schedule from September through October. If construction activities are necessary during the nesting season (February 15 through August 30), preconstruction surveys will be required to identify the location of active special-status and non-special status migratory bird or raptor nests, and appropriate buffers will be implemented according to Mitigation Measure BIO-MM-1 to reduce this effect to a less-than-significant level. Conducting mandatory biological awareness training for all construction personnel and implementing general protection measures, as required under Mitigation Measure BIO-MM-2, would further reduce this effect to a less-than-significant level.

Mitigation Measure BIO-MM-1: Avoid Disturbance of Tree-, Shrub, and Ground-Nesting Special-Status and Non-Special-Status Migratory Birds and Raptors and Conduct Preconstruction Nesting Bird Surveys

To avoid and minimize effects on nesting special-status and non-special status migratory birds and raptors, RD 108 will implement the appropriate surveys and restrictions, as follows.

- To avoid removing or disturbing any active Swainson's hawk or other migratory bird and raptor nests, construction activities (vegetation removal) will be conducted during the nonbreeding season (generally between September 1 and February 14) or after a qualified biologist determines that fledglings have left an active nest. If construction activities cannot be postponed, preconstruction surveys and no-disturbance will be required, as described below.
- If construction or tree-removal activities will occur during the breeding season (February 15 through August 31), a qualified wildlife biologist (with knowledge of the species to be surveyed) will be retained to conduct a preconstruction survey for nesting birds and raptors in all trees, shrubs, and ground-nesting habitat within 500 feet (0.25 mile for Swainson's hawk) of construction activities, including vegetation removal and staging areas. The nesting survey will be conducted no more than 14 days prior to the start of construction.
- If the biologist determines that the area surveyed does not contain any active nests, then construction activities—including removal or pruning of trees and shrubs—can commence without any further mitigation.
- If an active nest is located in the survey area, an appropriate no-disturbance buffer will be established by the biologist. The buffer distance should be determined based on the species, nature of construction activities, and line of sight from the work area. At a minimum, all work will be conducted no less than 250 feet from an active raptor nest, 100 feet from an active migratory bird nest, or another distance as determined during informal consultation with CDFW and/or USFWS. A qualified wildlife biologist will monitor the nest to determine when the young have fledged. The biological monitor will have the authority to halt construction if there is any sign of distress to any raptor or migratory bird. Reference to this requirement and the MBTA will be included in the construction specifications.

Mitigation Measure BIO-MM-2: Conduct Mandatory Biological Resources Awareness Training for All Construction Personnel and Implement General Protection Measures

Before any ground-disturbing work (including vegetation clearing, grading, and equipment staging) occurs in the study area, a USFWS-approved biologist will conduct a mandatory biological resources awareness training for all construction personnel about sensitive biological resources (e.g., nesting birds, riparian trees, giant garter snakes, and western pond turtles). The training will cover the natural history, appearance (using representative photographs), and legal status of species as well as the avoidance and minimization measures to be implemented. Proof of personnel attendance will be provided to USFWS, CDFW, or other overseeing agencies as appropriate. If new construction personnel are added to the proposed action, the contractor will ensure that the new personnel receive the mandatory training before starting work.

RD 108 will clearly delineate the construction limits through the use of survey tape, pin flags, orange barrier fencing, or other means, and prohibit any construction-related traffic outside these boundaries. Requirements that will be followed by construction personnel are listed below.

- Construction vehicles will observe the posted speed limit on hard-surfaced roads and a 10-mile-per-hour speed limit on unpaved roads during travel in the construction area.
- Construction vehicles and equipment will restrict off-road travel to the designated construction areas.

- Construction vehicles left onsite overnight will be thoroughly inspected each day for snakes (both underneath the vehicle and in open cabs) before they are moved.
- All food-related trash will be disposed of in closed containers and removed from the construction area at least once per week during the construction period. Construction personnel will not feed or otherwise attract fish or wildlife to the construction site.
- No pets or firearms will be allowed in the construction area.
- To avoid entrapment of wildlife, all excavated steep-walled holes or trenches more than 1 foot deep will either be properly covered or provided with one or more escape ramps constructed of earth fill or wooden planks at the end of each workday.
- To prevent possible resource damage from hazardous materials such as motor oil or gasoline, construction personnel will not service vehicles or construction equipment outside designated staging areas.
- Any worker who inadvertently injures or kills a special-status species or finds one dead, injured, or entrapped will immediately report the incident to the biological monitor and construction foreman. The biological monitor will immediately notify RD 108, who will provide verbal notification to the USFWS Sacramento Endangered Species Office and/or the local CDFW warden or biologist within 1 working day. RD 108 will follow up with written notification to USFWS or CDFW within 5 working days. The biological monitor will follow up with RD 108 to ensure that the wildlife agencies were notified.

In addition to the measures above, RD 108 will retain a qualified biologist to monitor construction activities adjacent to sensitive biological resources (e.g., riparian trees, active nests, and occupied bat roosts). The biologist will assist the construction crew, as needed, to comply with all proposed action implementation restrictions and guidelines. In addition, the biologist will be responsible for ensuring that RD 108 or its contractors maintain the construction barrier fencing adjacent to sensitive biological resources.

Effect BIO-2: Disturbance or Loss of Giant Garter Snakes and Western Pond Turtles and Their Habitat (less than significant with mitigation)

No suitable aquatic giant garter snake or western pond turtle habitat exists in the study area. The CBD directly downstream of the existing KLOG structure (within approximately 300 feet) does not provide suitable aquatic habitat for giant garter snake or western pond turtle because of the high-flow waters coming out of the gates. However, suitable aquatic habitat for both species does occur in the vicinity of the study area, consisting of Sycamore Slough and the CBD upstream (and potentially more than 300 feet downstream) of the KLOG structure.

Suitable upland giant garter snake and western pond turtle habitat in the study area is limited to the banks of the CBD upstream of the existing KLOG structure, and the annual grassland within the staging area on the east bank of the CBD. Giant garter snakes and western pond turtles (if present) are expected to be primarily associated with aquatic habitat upstream or downstream of the study area and in uplands within 200 feet of these aquatic features. There are three CNDDDB-recorded occurrences of giant garter snake within 5 miles of the study area (California Department of Fish and Wildlife 2015). In addition, there are 12 records of occurrences within 5 miles of the study area from surveys conducted by USGS (Wylie and Amarello 2006). The closest known occurrence was documented within the CBD approximately 2.9 miles east of the study area (Wylie and Amarello 2006). There are no CNDDDB records of western pond turtle within 5 miles of the study area.

Construction of the proposed action would not result in the permanent loss of aquatic or upland giant garter snake or western pond turtle habitat because the areas proposed for the fish barrier and erosion repairs do not provide suitable habitat for either species. A small amount of potential upland habitat for giant garter snake and western pond turtle (up to 0.81 acre) located within 200 feet of suitable aquatic habitat would be temporarily disturbed during equipment access and staging (Figure 3.4-2). Effects would be temporary (approximately 2 months) and are not expected to substantially limit the availability of upland habitat for giant garter snake or western pond turtle in the vicinity of the study area. Disturbance or degradation of suitable aquatic habitat for giant garter snake and western pond turtle in or adjacent to the study area could occur from fuel or oil leaks or spills during construction activities adjacent to aquatic habitat.

Construction activities in and adjacent to suitable habitat could result in the injury, mortality, or disturbance of giant garter snakes. Giant garter snakes could be injured or crushed by construction equipment in or near suitable aquatic and upland habitat. Snakes could also be killed by construction vehicles traveling through the study area. Fuel or oil spills from construction equipment into aquatic habitat could also cause illness or mortality of giant garter snakes and western pond turtle. Noise and vibrations from construction equipment and presence of humans during construction activities may also disturb giant garter snakes or western pond turtle if present within the study area.

Most construction activities would be limited to the snake's active period (May 1 through October 1) when the potential for direct mortality is reduced because snakes can actively move and avoid danger. However, construction of the fish barrier would require construction during both September and October when agricultural fields are not draining irrigation water into the CBD. Giant garter snakes are not expected to be present in the CBD where the fish gate construction and the bank stabilization would occur (downstream and within approximately 300 feet of the existing KLOG structure) because the regular, high water flows through the gates make the habitat unsuitable for snakes, which prefer low-flow waterbodies. In addition, dewatering of the fish gate structure work area would occur prior to October 1 and would encourage any resident giant garter snakes (if present) to leave the aquatic portion of the construction area. If present, giant garter snakes in the upland ruderal grassland adjacent to the canal could be injured or killed during work within the snake's dormant period.

Potential effects on habitat for giant garter snake and western pond turtle would be considered significant. Implementation of Mitigation Measures BIO-MM-3 through BIO-MM-7, and WQ-MM-1, described in Section 3.3, *Hydrology and Water Quality*, would reduce potential effects on giant garter snake and western pond turtle to a less-than-significant level.

Mitigation Measure BIO-MM-3: Conduct Preconstruction Surveys and Monitoring for Giant Garter Snake and Other Sensitive Biological Resources

- RD 108 will retain a qualified biologist to monitor construction activities adjacent to sensitive biological resources (detailed surveys and monitoring requirements for giant garter snake are described below). The biologist will assist the construction crew, as needed, to comply with all proposed action implementation restrictions and guidelines. In addition, the biologist will be responsible for ensuring that RD 108 or its contractors maintain the construction barrier fencing adjacent to sensitive biological resources.
- Prior to ground-disturbing activities within suitable giant garter snake aquatic and upland habitat (undeveloped areas within 200 feet of suitable aquatic habitat), a USFWS-approved

biologist will conduct a preconstruction survey for giant garter snake and inspect construction barrier and/or exclusion fencing to ensure they are intact at the beginning of each work day. A USFWS-approved biologist will be onsite during all ground disturbing activities within suitable aquatic and upland habitat to monitor construction activities and ensure that giant garter snake protection measures are being implemented properly. If any snakes are observed within the construction area during construction, the biological monitor will be notified immediately so that they can make a positive identification of the snake. If practical, photographs will be taken of any snake found dead or alive in the construction area. If a giant garter snake is found within the construction area, the biological monitor will have the authority to stop construction activities until appropriate corrective measures have been completed or it is determined that the snake will not be harmed. Giant garter snakes encountered during construction activities will be allowed to move away from construction activities on their own. If unable to move away on their own, trapped or injured giant garter snakes will only be removed by a USFWS-approved biologist authorized to conduct relocation activities. The captured snake will be placed in the nearest suitable habitat that is outside of the construction area. RD 108 will provide verbal notification of relocation activities to USFWS within 1 working day and will follow up with a written account of the details of the incident within 5 working days.

- The biological monitor will prepare daily monitoring logs that include a description of construction activities; areas surveyed and monitored; communication with construction personnel, RD 108, and wildlife agencies; noncompliance issues and resolutions; and a list of all wildlife species observed during monitoring activities. The biological monitor will also record all observations of state and federally listed species on CNDDB field sheets and submit to CDFW.

Mitigation Measure BIO-MM-4: Install and Maintain Exclusion and Construction Barrier Fencing around Suitable Giant Garter Snake Habitat and Other Sensitive Biological Resources

To clearly demarcate the action area boundary and protect sensitive natural communities, RD 108 or its contractor will install temporary exclusion fencing around sensitive biological resource areas (e.g. riparian trees, giant garter snake habitat) 1 week prior to the start of construction activities. RD 108 will ensure that the temporary fencing is continuously maintained until all construction activities are completed and that construction equipment is confined to the designated work areas. Additional areas of silt fencing to prevent sediment from entering perennial drainage in the CBD will be installed where construction activities are occurring on the levees. The exclusion and silt fencing will be removed only after construction is entirely completed.

- Signage will be placed on the exclusion fencing that will explain the nature of the sensitive resource and warn that no effect on the resource is allowed. The fencing will include a buffer zone of at least 20 feet between the resource and construction activities, where feasible. All exclusion and silt fencing will be maintained in good condition throughout the construction period.
- To reduce the likelihood of giant garter snakes entering the construction area, RD 108 will install exclusion fencing and orange construction barrier fencing along the portions of the construction area that are within 200 feet of suitable aquatic habitat and provide suitable upland habitat. The exclusion and construction barrier fencing will be installed during the