# Western Yellow-billed cuckoo

## Existing Information

#### Endangered Species Act Status

USFWS listed the western distinct population segment (DPS) of the yellow-billed cuckoo (*Coccyzus americanus occidentalis*) (western yellow-billed cuckoo or cuckoo) as threatened on November 3, 2014 (79 FR 59992). On June 18, 2018, USFWS announced that it was initiating a 5-year status review to determine if the DPS should remain listed as threatened (83 FR 28251).

#### General Life History and Habitat Requirements

Western yellow-billed cuckoos prefer open woodlands near watercourses with clearings and low, dense, scrubby vegetation (Hughes 2015). In California, breeding habitat frequently consists of willows (Salix spp.) and Fremont cottonwoods (Populus fremontii) (Halterman et. al 2015:4). In southern California, cuckoos breed in desert riparian woodlands with willow, Fremont cottonwood, alder (Alnus sp.), walnut (Juglans sp.), box elder (Acer negundo), and dense mesquite (Prosopis spp.). Nests are primarily in willow, Fremont cottonwood, and mesquite. Nest sites are often within dense foliage provided by broad-leafed deciduous hardwoods. Nests are typically on a horizontal branch or vertical fork of a tree or large shrub 3 to 18 feet above the ground, but have been found up to 100 feet above the ground. (Hughes 2015). Along the Sacramento River nests have rarely been found in prune, English walnut, and almond orchards (Laymon 1998).

Western yellow-billed cuckoos require large blocks of riparian habitat for breeding (78 FR 61633). Patch size was found to be the most important habitat variable to predict presence of western yellow-billed cuckoos on the Sacramento River (Girvetz and Greco 2009). Large patch sizes (50 to 100 acres, with a minimum width of 328 feet) are typically required for cuckoo occupancy (Riparian Habitat Joint Venture 2004). However, cuckoos can occupy a minimum patch size of 37 acres (Dettling et al. 2015). Patch width and the distance between patches can also be important in determining potential cuckoo occupancy; multiple studies have found that the minimum patch width and maximum gap width for potential occupancy are both 100 meters (Girvetz and Greco 2009; Dettling et al. 2015).

Western populations of yellow-billed cuckoos begin arriving on breeding grounds during mid- to late May. Western yellow-billed cuckoos form pairs during mid-June or later and breed from June to August, with a peak from mid-July to early August (Hughes 2015). Breeding is restricted to the middle of summer, presumably because of a seasonal peak in large insect abundance (Rosenberg et al. 1982:270–271). To accommodate this, development of young is very rapid, with a breeding cycle of 17 days from egg-laying to fledging of young. Young can typically fly at about 3 weeks of age (Hughes 2015). Clutch size is typically two or three eggs (Hughes 2015) and usually there is one brood per year (Ehrlich et al. 1988:286). Two or even three broods are possible in years with a good food supply (Layman 1998). Although western yellow-billed cuckoos usually raise their own young, they are facultative brood parasites, meaning they occasionally lay their eggs in nests of other western yellow-billed cuckoos or of other bird species (Hughes 2015). During late summer, the cuckoos begin migrating south to their wintering grounds, and most have left the breeding grounds by mid-September (78 FR 61632; October 3, 2013).

Western yellow-billed cuckoos primarily feed on caterpillars, grasshoppers, katydids, and other large insects. Foraging habitat consists of open areas, woodland, orchards, and adjacent streams (Hughes 2015). Cottonwoods are used extensively for foraging and are an important component of foraging habitat (78 FR 61634; October 3, 2013).

Little is known about western yellow-billed cuckoo migratory habitat. Cuckoos may be found in a variety of vegetation types during migration, which suggests that the habitat needs of the cuckoo during migration are not as restricted as the habitat needs during the breeding season. Western yellow-billed cuckoos may also be found in smaller riparian patches during migration than those in which cuckoos typically nest (78 FR 61634).

#### Historical and Current Distribution and Abundance

Western yellow-billed cuckoo is a neotropical migrant bird that winters in South America and breeds mostly in North America (Hughes 2015). The historical breeding range of western yellow-billed cuckoo in California extended from San Diego County along the coast through San Francisco Bay to Sonoma County, the San Joaquin and Sacramento Valleys from Kern County to Shasta County, and many outlying sites in Siskiyou, Inyo, San Bernardino, and Imperial Counties. Breeding is now restricted to isolated locations along South Fork Kern River, lower Colorado River, and Sacramento River (Hughes 2015). The estimated breeding population in California is currently 40 to 50 pairs (78 FR 61639; October 3, 2013). Restoration of more than 6,000 acres of riparian forest along the Sacramento River has increased the amount of potential habitat for western yellow-billed cuckoo; however, the population of cuckoos along the river was estimated to be less than 30 pairs based on surveys conducted in 2012 and 2013 (Dettling et. al 2014:13–14).

#### Occurrence in the Action Area

There is suitable nesting habitat near the eastern end of the construction and inundation area where the action area intersects the Sacramento River (Figure 4.2-14). This area was mapped as potential habitat by Dettling et al. 2015. There are 10 records of western yellow-billed cuckoo occurrences within a 5-mile radius of the action area (CDFW 2019) (Figure 4.2-13). The closest CNNDB record (from 2012) is located approximately 0.35 miles northeast of the action area, on the east bank of the Sacramento River and within the habitat mapped by Dettling et al. 2015. A small portion of the action area along the Sacramento River is located in proposed critical habitat for western yellow-billed cuckoo.

#### Limiting Factors, Threats, and Stressors

In 2013, when the western yellow-billed cuckoo was proposed for listing, the California population was less than 1 percent of its estimated historical population size (78 FR 61637). The primary factors leading to the decline of western yellow-billed cuckoo are riparian habitat loss and degradation. Viable populations of cuckoo cannot be maintained without ongoing recruitment and maturation of vegetation within large expanses of riparian habitat. Alteration of hydrology from dams, levees, bank stabilizations, water diversions, channelization, and river flow management that is inconsistent with natural hydrological patterns has resulted in the loss, modification, and degradation of riparian habitat (78 FR 61643). Another past and current contributor to riparian habitat loss is conversion of riparian areas for agricultural crops and livestock grazing. Impacts of livestock grazing on riparian habitat include introduction of nonnative plants, soil compaction, decreases in plant species diversity that result in changes in the structure and composition of riparian vegetation, and may decrease habitat suitability for western yellow-billed cuckoo (78 FR 61648).

Climate change may affect western yellow-billed cuckoo directly through physiological stress and through changes in the availability and distribution of habitat. In California, climate change is generally predicted to result in a warmer and drier climate, with less frequent and more severe precipitation events that, depending on site conditions, may negatively affect western yellow-billed cuckoo habitat. Rivers are anticipated to have more winter flooding and reduced summer stream flows. Persistent drought would cause a decrease in the amount of surface ground water available to sustain and regenerate riparian forests, increased fire frequency, and the spread of nonnative plan species. Drought could also adversely affect food availability by disrupting the synchrony of nesting cuckoos and their food resources (78 FR 61653).

For the purpose of assessing the distribution of western yellow-billed cuckoo in the action area, the species model included riparian areas identified through aerial imagery with a minimum patch size of more than 37 acres and with minimum patch widths of 100 meters and maximum gap widths of 100 meters.

#### Recovery

No recovery plan has been published for this species.

#### Critical Habitat

Critical habitat was proposed on August 15, 2014 (79 FR 48547). A final rule designating critical habitat has not been published. The Primary Constituent Elements (PCEs) of proposed yellow-billed cuckoo critical habitat are those habitat elements within designated critical habitat units that provide sufficient riparian habitat for breeding, non-breeding, territorial, dispersing and migrating yellow-billed cuckoo and to yellow-billed cuckoo throughout their range, and provide those habitat components essential for conservation of the subspecies. USFWS proposed the following PCEs for cuckoo critical habitat:

PCE 1: Riparian woodlands. Riparian woodlands with mixed willow and cottonwood vegetation, mesquite-thorn forest vegetation, or a combination of these that contain habitat for nesting and foraging in contiguous or nearly contiguous patches that are greater than 325 feet (100 meters) in width and 200 acres (81 hectares) or more in extent. These habitat patches contain one or more nesting groves, which are generally willow-dominated, have above average canopy closure (greater than 70 percent), and have a cooler, more humid environment than the surrounding riparian and upland habitats.

PCE 2: Adequate prey base. Presence of a prey base consisting of large insect fauna (for example, cicadas, caterpillars, katydids, grasshoppers, large beetles, dragonflies) and tree frogs for adults and young in breeding areas during the nesting season and in post-breeding dispersal areas.

PCE 3: Dynamic riverine processes. River systems that are dynamic and provide hydrologic processes that encourage sediment movement and deposits that allow seedling germination and promote plant growth, maintenance, health, and vigor (e.g. lower gradient streams and broad floodplains, elevated subsurface groundwater table, and perennial rivers and streams). This allows habitat to regenerate at regular intervals, leading to riparian vegetation with variously aged patches from young to old.

Proposed critical habitat Unit 2: CA-2 Sacramento River, Colusa, Glenn, Butte, and Tehama Counties overlaps with the action area. The critical habitat unit in located along the Sacramento River in the action area from Red Bluff to Colusa.

### **Effects**

This section describes the effects of geotechnical investigations on western yellow-billed cuckoo.

#### Geotechnical Investigations

###### Direct Effects

Proposed geotechnical activities would avoid disturbance of riparian forest habitat suitable for yellow-billed cuckoo. Geotechnical activities for the Delevan Pumping Plant and in the Sacramento River may take place near suitable yellow-billed cuckoo nesting habitat along the eastern bank of the Sacramento River. Depending on the time of year that these activities would take place, and whether yellow-billed cuckoo is present in the vicinity during the geotechnical activities, yellow-billed cuckoo in the vicinity of these activities could be affected by noise, visual disturbance from human presence, and vibrations associated with the geotechnical testing. These disturbances could disrupt normal migrating, foraging, and breeding behaviors.

Helicopters would likely be used for subsurface geotechnical investigations in areas with limited road access. Helicopter activity such as landing, taking off, and flying over cuckoo foraging and breeding territories could disrupt normal cuckoo behaviors such as courtship, nest building, egg and nestling incubation, and foraging. However, because no helicopters would be used where suitable cuckoo habitat is present along the Sacramento River, helicopter use is not anticipated to affect this species.

Implementation of the conservation measures would avoid effects on yellow-billed cuckoo by avoiding direct disturbance of suitable habitat for the species, as described in Chapter 2, Section 2.5.3.1, General Conservation Measures, and Section 2.5.3.7, Western Yellow-billed Cuckoo Conservation Measures. The Geotechnical Investigations conservation measure in Section 2.5.3.7 includes avoiding activities within 500 feet of occupied western yellow-billed cuckoo habitat from May 15 through September 30, pre-activity surveys to identify if yellow-billed cuckoo is present within the work area, establishing a no-disturbance buffer if active nests are discovered, and biological monitoring in the vicinity of all active cuckoo nests to ensure that construction activities do not affect nest success. Avoidance and Minimization Specific to Geotechnical Exploration in Section 2.5.3.1 includes routing helicopter routes to avoid potential or known yellow-billed cuckoo nest locations. With the implementation of conservation measures, geotechnical investigations would completely avoid adverse effects on yellow-billed cuckoo.

###### Indirect Effects

Geotechnical and geophysical investigations would avoid disturbance of western yellow-billed cuckoo habitat, and indirect effects of geotechnical investigations are not anticipated.

#### Construction

###### Direct Effects

Potential Injury or Mortality from Construction Activities

Various construction activities could result in injury or mortality of western yellow-billed cuckoo if they take place within occupied habitat. The construction footprint, however, is 380 feet from the nearest modeled western yellow-billed cuckoo. Therefore, the project would avoid direct construction-related injury or mortality of individuals in the construction zone.

Other Potential Construction-Related Disturbance

Construction activities associated with the Delevan Pipeline, the Delevan Pipeline Intake/Discharge Facilities, and other facilities within the Delevan Pipeline Complex would generate noise levels between 80 and 85 dBA at a 50-foot distance, but would attenuate to approximately 55 dBA at 0.5 mile (Sites Project Authority and Bureau of Reclamation 2017:27-22). Construction of the Delevan Pipeline Complex facility would also require the use of a vibratory pile driver to install a cofferdam in the Sacramento River. Noise modeling results indicate that noise levels from installation of the cofferdam would be approximately 58 dBA at 0.3 mile. Generation of mechanical noise that takes place during the cuckoo nesting season could alter normal breeding and foraging behaviors, resulting in nest abandonment or nest failure. Additionally, studies suggest that migrating birds will avoid noisy areas during migration (McClure et al. 2013). 60 dBA is the standard noise threshold for birds (Dooling and Popper 2007) that is applied during the nesting season, when birds are more vulnerable to behavioral modifications that can lead to nest failure. This effect would be minimized by reducing noise in the vicinity of yellow-billed cuckoo habitat as described in Section 2.5.3.1, *Terrestrial Species Conservation Measures, and* Section 2.5.3.7 *Western Yellow-billed Cuckoo Conservation Measures*. *Minimization of Noise Related Effects* in Section 2.5.3.7 would include surveys for yellow-billed cuckoo within the 60 dBA noise contour around the construction footprint during the period from June 1 through September 14, and if the species is found, limiting noise to less than 60 dBA where the bird occurs until it has left the area. This measure also includes re-routing construction traffic away from cuckoo migratory habitat to reduce construction noise impacts.

Construction activities in the visual line-of-sight of cuckoo nests and night lighting could potentially affect yellow-billed cuckoos. Nighttime construction work may occur on an as needed basis. While there is little data on effects of night lighting on this species, studies show that other bird species are attracted to artificial lights and this may disrupt their behavioral patterns or cause collision-related fatalities (Van Doren et al. 2017, Furuya 2017, Gauthreaux and Belser 2006). Disruption of normal behaviors could make individuals more susceptible to predation, result in impairment of feeding or breeding behaviors, or reduction of reproductive success. To minimize this effect, the Authority would screen all lights and direct them away from habitats, as described in Chapter 2, Section 2.5.3.1, *General Conservation Measures*, under *Minimize Effects of Lighting.* With this measure in effect, residual lighting effects on yellow-billed cuckoo are not expected to result in take of the species.

Permanent Habitat Loss

The construction and inundation components of the Proposed Action would not result in any permanent habitat loss for western yellow-billed cuckoo.

Temporary Habitat Loss

The construction and inundation components of the Proposed Action would not result in any temporary habitat loss for western yellow-billed cuckoo.

###### Indirect Effects

Indirect effects are effects that are reasonably certain to result from the Proposed Action but which would occur later in time. Some indirect effects of the Proposed Action are described in Section X, *Operational Effects on Terrestrial Species*, rather than this section*.*

Predation and Invasive Species

The new reservoir and associated facilities could attract Common ravens (*Corvus corax*), American crows (*Corvus brachyrhynchos*), California scrub jay (*Aphelocoma californica*), magpies, and accipiters that prey upon cuckoo nests.

Degradation of cottonwood riparian habitat as a result of invasion by salt cedar (*Tamarisk* sp.) and giant reed (*Arundo donax*) is also a problem in the cuckoo’s range. Along the Sacramento River, domestic fig (*Ficus carica*) and black walnut (*Juglans nigra*) have become a dominate tree species; these species provide poor foraging opportunities and do not offer suitable nest sites for yellow-billed cuckoo (Laymon 1998). Other nonnative species of concern in the cuckoo’s range include cheatgrass (*Bromus tectorum*), giant salvinia (*Salvinia molesta*), water milfoil (*Myriophyllum spicatum*), and parrot’s feather (*M. aquaticum*) (Halterman et al. 2015). The Authority would minimize the spread of invasive plant species through the implementation of the *Invasive Plant Species* conservation measure in Section 2.5.3.1, *General Conservation Measures*.

Disturbance from Recreation

Recreation activities associated with the newly constructed recreation areas would not affect yellow-billed cuckoo because these areas are not located within or near known occupied areas or suitable cuckoo habitat. Recreation activities would take place more than 10 miles west of known yellow-billed cuckoo occurrences (California Department of Fish and Wildlife 2019).

###### Critical Habitat

The Primary Constituent Elements (PCEs) of proposed yellow-billed cuckoo critical habitat are described in Section 4.2.10.7, *Critical Habitat.* The PCEs for this species are those habitat elements within designated critical habitat units that provide sufficient riparian habitat for breeding, non-breeding, territorial, dispersing, and migrating yellow-billed cuckoo and to yellow-billed cuckoo throughout their range, and provide those habitat components essential for conservation of the yellow-billed cuckoo. The modeled habitat for western yellow-billed cuckoo in the action area corresponds with these PCEs.

The action area is located within proposed critical habitat Unit 2: CA-2, Sacramento River, Colusa, Glenn, Butte, and Tehama Counties. The footprint for the Delevan Pipeline Intake/Discharge Facilities overlaps with 9.2 acres of critical habitat Unit 2, but there are no habitat patches within this area large enough to support western yellow-billed cuckoo, based on Dettling et al. (2015). Therefore, the affected area does not provide the necessary components to support the species or its PCEs, and western yellow-billed cuckoo critical habitat would not be affected by construction of the Proposed Action.

#### Operation

###### Direct Effects

Potential Disturbance from Maintenance Activities

Noise and lighting in the vicinity of the reservoir and associated structures could disturb western yellow-billed cuckoo behavioral patterns within suitable habitat if the species is present. To minimize this effect, the Authority would screen all lights and direct them away from habitats, as described in in Section 2.5.4.X, *Yellow-billed Cuckoo Conservation Measures*. With this measure in effect, residual lighting effects on yellow-billed cuckoo are not expected to adversely affect the species.

Downstream Hydrologic Effects

***[Note:*** *ICF is coordinating with USFWS and the consultant team to develop a methodology for assessing downstream hydrologic effects on western yellow-billed cuckoo.]*

###### Indirect Effects

There would be no anticipated indirect effects on western yellow-billed cuckoo from operation beyond the effects described above.

###### Critical Habitat

***[Note:*** *ICF is coordinating with USFWS and the consultant team to develop a methodology for assessing downstream hydrologic effects on western yellow-billed cuckoo.]*

## General Conservation Measures and Avoidance and Minimization Measures

### General Terrestrial Species Conservation Measures

##### G-CM1: Conduct Biological Resources Awareness Training

Prior to the start of ground-disturbing work (including vegetation clearing, grading, and equipment staging), a USFWS-approved biologist will conduct a mandatory biological resources awareness training for all construction personnel. This training will cover sensitive biological resources. The training will cover the natural history, appearance (using representative photographs), and legal status of species, regulatory protections, penalties for noncompliance, benefits of compliance, as well as the avoidance and minimization measures to be implemented. Participants will be required to sign a form that states they have received and understand the training. The Sites Authority will maintain the record of training and make it available to agencies, upon request. If new construction personnel are hired for the Project, the contractor will ensure that the new personnel receive the mandatory training before starting work.

##### G-CM2: Treatment of Vehicles, Equipment, Hazardous Materials, and Dust

Construction vehicles will observe the posted speed limit on hard-surfaced roads and a 10 mile-per­hour speed limit on unpaved roads during travel within habitat for federally listed species. Construction vehicles and equipment will restrict off-road travel to the designated construction areas. Construction vehicles and equipment left on-site overnight will be thoroughly inspected each day for snakes and frogs (both underneath the vehicle and in open cabs) before they are moved. All construction equipment will be maintained to prevent leaks of fuels, lubricants, or other fluids. To prevent possible resource damage from hazardous materials such as motor oil or gasoline, construction personnel will not service or refuel vehicles, construction equipment, or motorized tools within 300 feet of potentially suitable frog or snake aquatic habitat. Gravel roadways, staging areas, and other applicable areas will be sprayed with water as needed to minimize dust during construction activities, particularly in the vicinity of listed species habitat such as elderberry shrubs.

##### G-CM4: Notification

The Sites Authority will notify USFWS within 24 hours in the event that a federally listed species becomes injured or killed at a construction site.

##### G-CM7: Minimization of Habitat Disturbance

The Sites Authority will limit habitat disturbance to the minimal area necessary to facilitate construction. The boundaries of the disturbance areas (including staging, access, and construction areas), will be clearly marked and construction personnel and equipment will be confined within the delineated boundaries.

##### G-CM8: Avoidance and Minimization Specific to Geotechnical Exploration

General restrictions and guidelines that will be followed by personnel are listed below. The project foreman will be responsible for ensuring that crew members adhere to these guidelines and restrictions.

* No less than 1 week prior to mobilization, the Project geologist, drilling foreman, and agency-approved biologist will conduct a joint pre-geotechnical explorations survey. This team will review the site location and drilling plan and coordinate in the field the final locations of the borehole and geophysics lines, and the extent of the ground surface preparations (if any) at each bore location. The team will also confirm means of access by geotechnical studies personnel, and coordinate in the field the final means of transportation and route of transportation for accessing the locations.
* Biologists approved by USFWS and CDFW will conduct pre-construction surveys prior to the initiation of activities and will monitor these activities. Details are provided in Conservation Measures 4, 6, 7, and 8.
* Personnel driving vehicles will observe the posted speed limit on paved roads and a 10 mile-per-hour speed limit on unpaved roads during travel in the work area.
* Helicopter flights will follow designated routes to avoid potential and known nest locations for raptors, such as Swainson’s hawk, bald eagle, and golden eagles, and other special-status avian species, such as yellow-billed cuckoo. The timing of helicopter use (i.e., landing/take off and equipment delivery) will be adjusted based on the results of special-status/nesting bird surveys. Restrictions would be developed based on site specific conditions (e.g., proximity and status of the nest, baseline noise conditions, topography) and would include limiting flight times outside of periods of high activity (e.g., morning and dusk) and outside of sensitive nesting periods, such as egg incubation.
* All food-related trash will be disposed of in closed containers and removed from the work area daily during the work period. Personnel will not feed or otherwise attract fish or wildlife to the work site.
* No pets or firearms will be allowed in the work areas.
* Sites will follow USFWS-approved decontamination protocols prior to any staff (biologists, surveyors, geotechnical investigation workers), equipment, tools, or vehicles entering action area waters or moist soils associated with waters in order to minimize the spread of pathogens. At a minimum, these measures will include the following:
* All organic matter should be removed from boots and vehicle tires and all other surfaces that have come into contact with water or potentially contaminated sediments. Cleaned items should be rinsed with clean water before leaving each study site.
* Boots and hands, etc. should be scrubbed with either a 75% ethanol solution, a bleach solution (0.5 to 1.0 cup per 1.0 gallon of water), Quat-128™ (1:60), or a 6% sodium hypochlorite 3 solution. Equipment should be rinsed clean with water between work areas. Cleaning equipment in the immediate vicinity of a pond or wetland should be avoided (e.g., clean in an area at least 100 feet from aquatic features). Care should be taken so that all traces of the disinfectant are removed before entering the next aquatic habitat.
* Used cleaning materials (liquids, etc.) should be disposed of safely, and if necessary, taken back to a facility proper disposal. Used disposable gloves should be retained for safe disposal in sealed bags.
* All equipment will be maintained to prevent leaks of fuels, lubricants, or other fluids.
* Temporary signs, staking, or flagging will be used to identify sensitive biological resources and project personnel will be advised to avoid disturbance of these areas. These areas will be identified during pre-activity surveys. Signs, staking, and flagging will be inspected by the biological monitor on a daily basis.
* Any worker who inadvertently injures or kills a sensitive species or finds one dead, injured, or entrapped will immediately report the incident to the project foreman, who will immediately report the incident to the Authority. The Authority will provide oral notification to the USFWS Sacramento Endangered Species Office and the local CDFW warden or biologist within 1 working day. The Authority will follow up with written notification to USFWS and CDFW (if necessary) within 5 working days.
* Vehicles and equipment left on-site overnight will be thoroughly inspected each day for wildlife (both underneath the vehicle and in open cabs) before they are moved. To prevent possible resource damage from hazardous materials such as motor oil or gasoline, personnel will not service or refuel vehicles, equipment, or motorized tools within 300 feet of potentially suitable California red-legged frog or giant garter snake aquatic habitat.
* Maintain equipment and materials necessary for cleanup of accidental spills onsite. Clean up accidental spills and leaks immediately and dispose of properly.
* Limit clearing of vegetation and scraping or digging of soil to the minimal area necessary to facilitate geotechnical and geophysical activities.
* In the event that any of the geotechnical or geophysical work areas need to moved or additional locations are needed, then these areas will be reviewed for sensitive biological resources applying the same methodology as described in this Biological Assessment, which includes a process for adjusting the locations to avoid and minimize effects on sensitive biological resources. The same conservation measures described here will apply to these locations to assure that effects are avoided and minimized. Sites will notify UFWS and CDFW on any new or relocated work areas in a brief letter report with a map prior to work beginning at these locations.
* If no suitable upland disposal location is located nearby (i.e., one that would not result in discharges to sensitive biological resources including habitat of listed aquatic or semi-aquatic species) investigation-derived groundwater generated during field activities will be placed into water tanks and/or 55-gallon drums and disposed of offsite in an area without sensitive biological resources. Disposal of this water in either uplands near the investigation site or in offsite locations will be completed in accordance with Order R5-2016-0076-01 for Limited Threat Discharges to Surface Water or *General Waste Discharge Requirements for Discharges to Land with a Low Threat to Water Quality* 2003-003-DWQ, as applicable.
* If water drafting (pumping from the Sacramento River or other waterways in the action area) is needed, then and all intakes used to draft water will be screened to protect special-status fish and special-status amphibians, including eggs, larvae, and adults, from being entrained with water being pumped from the waterway. Screens will be installed, operated, and maintained according to applicable CDFW and NMFS fish screening criteria for salmonid fry (California Department of Fish and Game 2002a; National Marine Fisheries Service 1997). Fish screens meeting CDFW and NMFS criteria to protect salmonid fry have the following specifications:
* A minimum effective screen area[[1]](#footnote-1) of 3.0 square feet per cubic feet per second, and a nominal maximum approach velocity[[2]](#footnote-2) of 0.33 feet per second.
* Screen face material consisting of the following dimensions:
* Perforated plate: screen openings shall not exceed 3/32 inch (2.38 millimeters), measured in diameter.
* Profile bar: screen openings shall not exceed 0.0689 inch (1.75 millimeters) in width.
* Woven wire: screen openings shall not exceed 3/32 inch (2.38 millimeters), measured diagonally (e.g., 6 to 14 mesh).
* Screen material with a minimum of 27 percent open area.

##### G-CM9: Miscellaneous Measures

1. All food-related trash will be disposed of in closed containers and removed from the construction area daily during the construction period. Construction personnel will not feed or otherwise attract fish or wildlife to the construction site.
2. No pets or firearms will be allowed in the construction area.

##### G-CM10: Restoration of Temporarily Disturbed Area

The Authority will restore temporarily disturbed areas to pre-project conditions within a year after the activity causing habitat disturbance is completed. When restoring temporarily-impacted habitat, the Sites Authority must utilize native plant species appropriate to the area and will control the spread of invasive plant species.

##### G-CM11: Minimize Effects of Lighting

For all construction lighting and permanent lighting associated with facilities, the Authority will shield the lights and direct them away from adjacent habitat areas.

Operate portable lights at the lowest allowable wattage and height, while in accordance with the National Cooperative Highway Research Program’s Report 498: Illumination Guidelines for Nighttime Highway Work.

##### G-CM12: Invasive Plant Species

To minimize the spread of nonnative, invasive plant species from the action area, the Authority will retain a qualified botanist or weed scientist prior to clearing operations to determine if affected areas contain invasive plants. If areas to be cleared contain invasive plants, then chipped vegetation material from those areas will not be used for erosion control. In these cases, the material will be disposed of to minimize the spread of invasive plant propagules (e.g., burning, composting).

To minimize the introduction of invasive plant species, construction vehicles and construction machinery will be cleaned prior to entering construction sites that are in or adjacent to natural communities other than cultivated lands, and prior to entering any restoration sites or conservation lands other than cultivated lands. Vehicles working in or travelling off paved roads through areas with infestations of invasive plant species will be cleaned before travelling to other parts of the Project area. Cleaning stations will be established at the perimeter of covered activities along construction routes as well as at the entrance to reserve system lands. Biological monitoring will include locating and mapping locations of invasive plant species within the construction areas during the construction phase and the restoration phase. Infestations of invasive plant species will be targeted for control or eradication as part of the restoration and revegetation of temporarily disturbed construction areas.

### Species Specific Avoidance and Minimization Measures

##### YBCC-CM1: Geotechnical Investigations

Geotechnical boring and geophysical investigations will be sited outside of western yellow-billed cuckoo habitat [patches of riparian habitat 50 acres or larger (Halterman et al. 2015)]. To minimize disturbance on nearby nesting wester yellow-billed cuckoo, the following measures will be implemented.

* Prior to geotechnical boring and geophysical investigations taking place between May 15 through September 1, all suitable yellow-billed cuckoo habitat within 1,200 feet of work areas will be surveyed for individuals or active nests. Surveys conducted in accordance with “A Natural History Summary and Survey Protocol for the Western Distinct Population Segment of the Yellow-billed Cuckoo” from April 2015, or as updated.
* If an active nest is found within the area surveyed, a no disturbance buffer will be established to ensure that activities do not disrupt normal nesting behaviors. Buffers will be determined by the biologists in consultation with USFWS and CDFW and will depend on the level of noise or disturbance, line-of-sight between the nest and the disturbance, ambient levels of noise and other disturbances, and other topographical or artificial barriers.
* In addition to the buffers, the following measures will be implemented if an active nest is found within 1,200 feet of the work areas.
* Located, store, and maintain equipment as far as reasonably possible from suitable yellow-billed cuckoo habitat.
* Minimize noise.
* Screen all lights and direct them down tower work activities away from cuckoo habitat. A biological monitor will ensure that lights are properly directed at all times.
* Operate portable lights at the lowest allowable wattage and height to achieve construction activities.
* Geotechnical and geophysical activities will be avoided within 500 feet of occupied yellow-billed cuckoo habitat from May 15 through September 30. Occupied habitat will be determined based on surveys conducted.

##### YBCC-CM2: Habitat Avoidance

Temporary construction areas, staging areas, and access roads with flexible locations will be located to avoid disturbance of western yellow-billed cuckoo suitable habitat with a buffer of at least 500 feet between the activity and the habitat. Locate, store, and maintain portable and stationary equipment as far as possible from suitable western yellow-billed cuckoo habitat.

##### YBCC-CM3: Timing for Unavoidable Habitat Removal

Where habitat removal is unavoidable within the construction and inundation area, the Authority will remove the habitat during the period of Mid-September through late May, outside the species’ breeding season.

##### YBCC-CM4: Minimization of Effects Related to Human Activity in the Vicinity of Construction

The Authority will implement the following measures for project components within 500 feet of western yellow-billed cuckoo habitat.

* Prior to construction, all suitable western yellow-billed cuckoo habitat within 500 feet of the activity will be surveyed in accordance with “A Natural History Summary and Survey Protocol for the Western Distinct Population Segment of the Yellow-billed Cuckoo”, from April 2015, or as updated.
* At least five surveys will be conducted in suitable habitats within 30 days of the onset of construction, with the last within 3 days of the onset of construction, by a qualified biologist with experience surveying and observing these species and familiar with their vocalizations.
* If an active nest site is present, a 500-foot no-disturbance buffer will be established around nest sites during the breeding season (generally, late February through late August).
* The required no-disturbance buffer may be reduced in areas where barriers or topographic relief are sufficient to protect the nest from excessive noise or other disturbance. Sites Authority will coordinate with USFWS and evaluate exceptions to the minimum no-disturbance buffer distance on a case-by-case basis.
* If occupied nests are identified, a qualified biologist will monitor construction activities in the vicinity of all active western yellow-billed cuckoo nests to ensure that covered activities do not affect nest success.

##### YBCC-CM5: Minimization of Noise Related Effects

If construction is to occur within 1,200 feet of western yellow-billed cuckoo habitat during the period of from June 1through September 14, the following measures will be implemented to avoid noise effects on migrating western yellow-billed cuckoos.

* Prior to the construction, a noise expert will create a noise contour map showing the 60 dBA noise contour specific to the type and location of construction to occur in the area.
* During the western yellow-billed cuckoo breeding season, a USFWS-approved biologist will survey any suitable nesting habitat for yellow-billed cuckoos within the 60 dBA noise contour on a daily basis during a two-week period prior to construction. While construction is occurring within this work window, the USFWS-approved biologist will conduct daily surveys in any suitable habitat where construction related noise levels could exceed 60 dBA (A-weighted decibel) Leq (1 hour). If a yellow-billed cuckoo is found, sound will be limited to 60dBA in the habitat being used until the USFWS-approved biologist has confirmed that the bird has left the area.
* Construction vehicle and equipment traffic will be re-routed as necessary to reduce construction noise impacts on cukoo migratory habitat. Route truck traffic in order to reduce construction noise impacts and traffic noise levels within 1,200 feet of suitable western yellow-billed cuckoo migratory habitat during migration periods.
* Employ preventive maintenance including practicable methods and devices to control, prevent, and minimize noise.
* Limit trucking activities (e.g., deliveries, export of materials) to the hours of 7:00 a.m. to 10:00 p.m.

## Compensation

##### YBCC-CM6: Compensation for Unavoidable Loss of Habitat

Where identified and delineated yellow-billed cuckoo habitat cannot be avoided, compensation for the permanent loss of the habitat will occur at a rate of 3:1 for suitable riparian and upland habitat. An estimated [TBD] acres of yellow-billed cuckoo habitat will be permanently affected. To offset this effect the Authority will restore [TBD] acres of western yellow-billed cuckoo habitat in proposed critical habitat Unit 2.

1. *Effective screen area* - the total submerged screen area, excluding major structural members, but including the screen face material. The minimum *effective screen area* is calculated by dividing the maximum screened flow by the allowable approach velocity. [↑](#footnote-ref-1)
2. *Approach velocity* - the vector component of velocity that is perpendicular to the vertical projection of the screen face, calculated by dividing the maximum screened flow by the effective screen area. An exception to this definition is for end-of-pipe cylindrical screens, where the *approach velocity* is calculated using the entire effective screen area. [↑](#footnote-ref-2)