BIO-3 GENERAL WILDLIFE RESOURCES TECHNICAL MEMORANDUM

KERN RIVER NO. 3 HYDROELECTRIC PROJECT
FERC PROJECT NO. 2290

PREPARED FOR:

SOUTHERN CALIFORNIA EDISON®

Energy for What's Ahead®

KERNVILLE, CALIFORNIA

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LIST OF ACRONYMS AND ABBREVIATIONS

DPS	Distinct Population Segment
ESA	Endangered Species Act
Fed. Reg.	Federal Register
FERC	Federal Energy Regulatory Commission
FSCC	Forest Species of Conservation Concern
KR3	Kern River No. 3
NFKR	North Fork Kern River
Project	Kern River No. 3 Hydroelectric Project (FERC Project No. 2290)
RSP	Revised Study Plan
SCE	Southern California Edison
SPD	Study Plan Determination
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service

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1.0 INTRODUCTION

This Technical Report provides the methods and findings of field surveys and literature review associated with the *BIO-3 General Wildlife Resources Study Plan* in support of Southern California Edison's (SCE) Kern River No. 3 (KR3) Hydroelectric Project (Project) relicensing, Federal Energy Regulatory Commission (FERC) Project No. 2290. The BIO-3 Study Plan was included in SCE's Revised Study Plan (RSP) submitted on July 1, 2022 (SCE, 2022). In the October 12, 2022, Study Plan Determination (SPD), FERC approved the BIO-3 Study Plan with modifications. Specifically, FERC recommended SCE do the following:

- Compile existing information on bats using Project facilities, including available information in consultation with the U.S. Forest Service (USFS).
- Modify the study area to include the bypass reaches downstream of Project diversions on Salmon Creek and Corral Creek and downstream of the Cannell Creek spillway to their confluence with the North Fork Kern River (NFKR).
- Modify the habitat suitability assessment phase of the plan to also identify and map any non-breeding habitat potentially used by Endangered Species Act (ESA)-listed species in the study area.
- Provide more information in future study reports on survey methods for each listed species potentially occurring in the Project Area, including but not limited to the following:
  - Describe the number of survey locations, points, and/or transects to be conducted within suitable breeding habitat, including, if applicable, the aggregate length of survey transects.
  - Provide, for each survey location, the duration of time that surveys are conducted, the frequency and duration of playbacks, and the total effort per species (e.g., total time per survey replicate).
  - Describe survey methods in sufficient detail for the Pacific fisher (*Pekania pennanti*), California condor (*Gymnogyps californianus*), and any special-status species identified as potentially affected by continued and proposed operation of the Project, including species-specific methodology, number of survey locations, survey effort (e.g., time, area), information collected (e.g., signs, habitat data), etc.
  - Use playback surveys for least Bell's vireo (*Vireo bellii pusillus*), southwestern willow flycatcher (*Empidonax traillii extimus*), and western yellow-billed cuckoo (*Coccyzus americanus occidentalis*).

Data collection efforts were initiated in April 2023 to July 2023 where literature reviews and field surveys for riparian birds (i.e., western yellow-billed cuckoo, southwestern willow flycatcher, and least Bell's vireo), California condor, and Pacific fisher were conducted. All field sampling efforts and data analysis are complete and summarized below.

2.0 STUDY GOALS AND OBJECTIVES

The objectives of the study, as outlined in BIO-3 Study Plan (SCE, 2022), was to supplement the existing information for the following species and any other special-status wildlife or Forest Species of Conservation Concern (FSCC):

- Western yellow-billed cuckoo
- Southwestern willow flycatcher
- Least Bell's vireo
- California condor
- Pacific fisher

This was done by:

- Identifying and mapping potentially suitable nesting or denning habitat in the study area, and
- Identifying and mapping their presence in the study area.

3.0 STUDY AREA AND STUDY AREAS

The study area includes lands and waters within the FERC Project Boundary in addition to areas adjacent to, or in the proximity of, the FERC Project Boundary along the NFKR and Salmon, Corral, and Cannell Creeks for the purposes of characterization and data collection relevant to understanding Project operations and maintenance activities. The study area is located on U.S. Geological Survey's Fairview and Kernville 7.5-minute topographic quadrangles. Specific study areas are further described below.

The study area (see Figure 3-1) included a 50-foot buffer around the aboveground locations, including:

- Fairview Dam, intake, and sandbox;
- Aboveground sections of the conveyance flowline, including the siphon;
- Fairview Dam Bypass Reach[1] from the river's edge to the outer edge of the riparian strip plus a 50-foot buffer, or to the edge of Mountain Highway 99, whichever is closer;
- Salmon Creek diversion, open flume, Adit 8B-9A, and adjacent access roads;
- Corral Creek diversion, open flume, and the access road;

[1] The Fairview Dam Bypass Reach is defined as the approximately 16-mile bypass reach of the NFKR between Fairview Dam and the KR3 Powerhouse tailrace.

- Cannell Creek, siphon, and access road;
- Gold Ledge Creek open flume, Adit 13–14, and adjacent access road;
- Pressure flume, forebay, and penstocks;
- Project access roads;
- KR3 Powerhouse and supporting maintenance buildings; and
- The NFKR confluences with Salmon, Gold Ledge, Corral, and Cannell Creeks.

The study area consists of upland vegetation communities in higher terrace areas and riparian in and adjacent to Kern River and select tributaries. Plant community types mapped in the study area consist of annual grasses and forbs, California buckwheat scrub, lower montane mixed chaparral, scrub oak chaparral, upper montane mixed chaparral, wedgeleaf ceanothus chaparral, willow (shrub) alliance, California black oak forest and woodland, canyon live oak woodland, Ponderosa pine forest and woodland, interior live oak alliance, interior live oak woodland and forest, riparian mixed hardwood alliance, and foothill pine woodland.

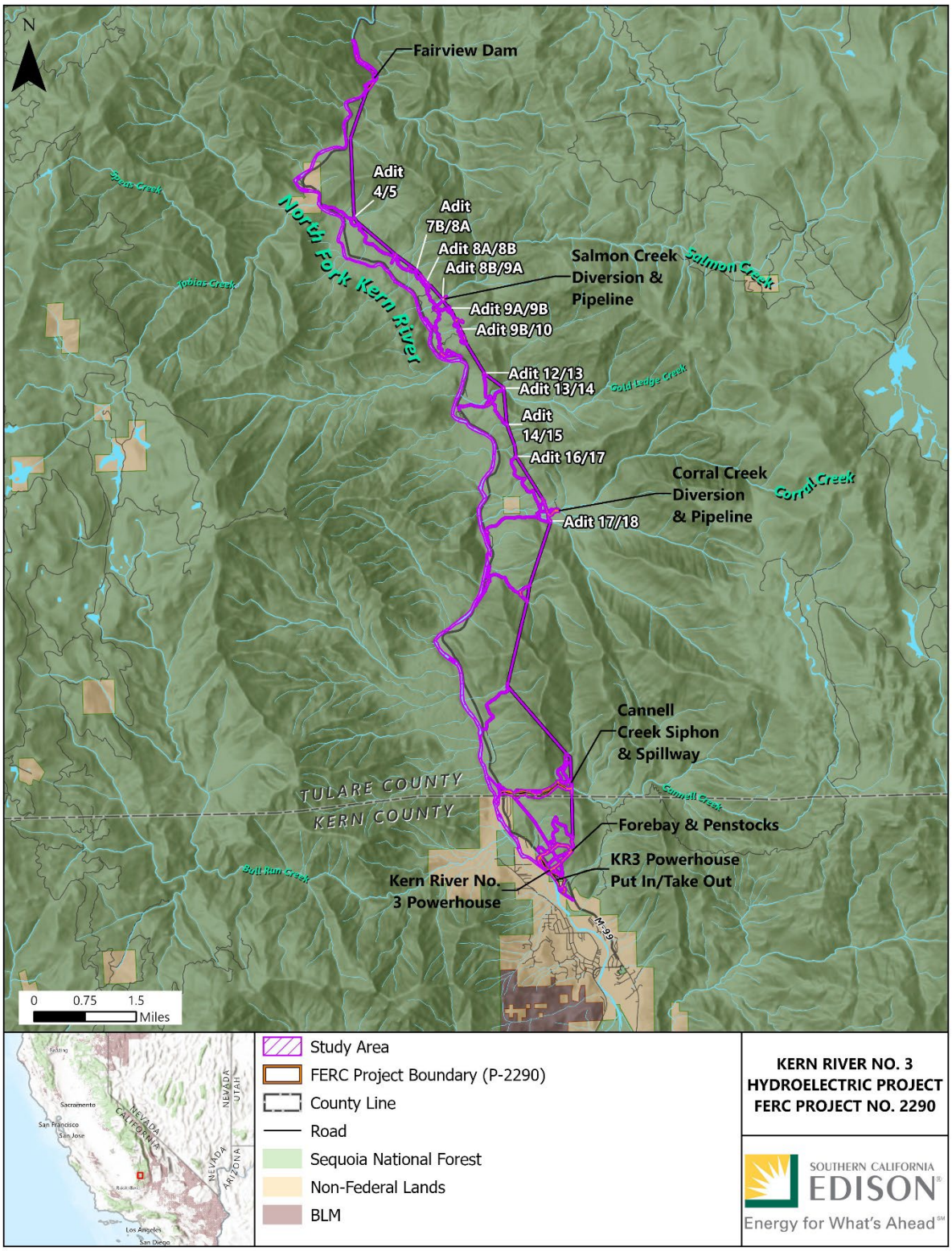

Figure 3-1. Wildlife Study Area.

4.0 METHODS

Study implementation generally followed the methods described in SCE's RSP (SCE, 2022), and as amended by FERC in their SPD (FERC, 2022), with the exceptions noted below.

Study Plan Variances

FERC recommended to use playback surveys for the lead Bell's vireo in the SPD (FERC, 2022). However, the least Bell's vireo survey protocol does not require the playback of vocalizations. Additionally, per U.S. Fish and Wildlife Service (USFWS; communication with Stacey Love), permits are not issued for playback of least Bell's vireo outside of conducting research and/or pulling them into mist nets for banding. Therefore, recorded least Bell's vireo vocalizations were not used during the surveys.

4.1. LITERATURE REVIEW

A literature review was conducted to determine if any additional special-status wildlife species or FSCC have been identified as having the potential to occur within the study area or in the surrounding Project Vicinity. This review included the study plans as well as previous biological reports prepared for individual projects such as *Southwestern Pond Turtle Observations during Pre-construction Surveys in Support of the KR3 Flowline Roads Improvement Project* (Psomas, 2013a); *Biological Resources Technical Report for the Kern River 3 Sandbox Repair Project* (Psomas, 2013b). The Pre-Application Document for the Project was also reviewed (SCE, 2021).

Museum records, AmphibiaWeb, as well as crowdsourcing platforms (e.g., iNaturalist) were also used during the literature review. In addition, the California Department of Fish and Wildlife's California Natural Diversity Database (CDFW, 2022) was queried for special-status wildlife species for the following U.S. Geological Survey's 7.5-minute topographic quadrangles: Johnsondale, Fairview, Kernville, Tobias Peak, Cannell Peak, Alta Sierra, and Lake Isabella.

The review verified the protective status of any of the previously identified special-status species and reviewed any new literature on the ecology and life history of special-status wildlife species and determine if any bat species have been identified as having the potential to occur within the study area or in the surrounding Project Vicinity.

USFS vegetation alliances were cross-referenced with the criteria for potentially suitable habitat for the above-listed species. Where the criteria for potentially suitable habitat intersect or match the USFS vegetation alliances, those areas were mapped as target areas for field surveys for the above species.

4.2. HABITAT ASSESSMENT

A habitat assessment for ESA-listed birds was conducted in the fall of 2022 concurrently with the habitat assessment for special status salamanders. Biologists walked the study area looking for potentially suitable habitat for special-status wildlife, especially ESA-listed

riparian birds based on habitat characteristics. Suitable habitat locations were mapped directly onto an iPad with pre-loaded study area maps. Biologists noted any incidental observations of non-native invasive aquatic species (e.g., bullfrog, crayfish, Asian clams, and invasive fishes) and other key species of interest (e.g., special-status freshwater mussels, aquatic reptiles, amphibians, bald eagle [*Haliaeetus leucocephalus*], osprey [*Pandion haliaetus*], great blue heron [*Ardea herodias*], and American dipper [*Cinclus mexicanus*]) on data sheets. The results of the habitat assessment survey were used to target specific areas within the Project that were the subject of Visual Encounter Surveys conducted in 2023.

4.3. FIELD SURVEYS

4.3.1. RIPARIAN BIRDS

Prior to the start of the surveys, field maps created from aerial photographs of each facility at a 1-inch to 200-foot scale were prepared for field use and included any known wildlife occurrences and areas of potentially suitable habitat for special-status wildlife. These field maps were pre-loaded onto an iPad for use in collecting data in the field. Surveys were performed at appropriate times of the year (e.g., nesting season) to maximize the opportunity to observe western yellow-billed cuckoo, southwestern willow flycatcher, least Bell's vireo, California condor, and Pacific fisher as determined by the literature review (USFWS, 1998, 2002; Sogge et al., 2010; Spencer et al., 2016; 85 Fed. Reg. 39 p. 11458).

Per USFWS guidelines, USFWS was notified on April 6, 2023, that Psomas was scheduled to begin non-protocol-level riparian bird surveys related to the Project. During surveys in appropriate riparian habitat, playback vocalizations were played for western yellow-billed cuckoo and southwestern willow flycatcher. As the least Bell's vireo survey protocol does not require the playback of least Bell's vireo vocalizations, recorded least Bell's vireo vocalizations were not used during the surveys.

Psomas Senior Biologist Lindsay Messett (USFWS Permit No. TE 067064-6) conducted all riparian bird surveys, looking specifically for western yellow-billed cuckoo, southwestern willow flycatcher, and least Bell's vireo. Psomas Biologist Sarah Thomas assisted on all surveys. Surveys were conducted on May 15, 16, 17, 18, June 21, 22, 23, and July 10, 11, and 12, 2023. The two Psomas biologists systematically surveyed by walking slowly and methodically along the margins of all riparian habitats, using meandering transects through the areas with wider riparian corridors in the survey area. Generally following the USFWS survey protocol for western yellow-billed cuckoo, Ms. Messett played recorded contact or "kowlp" calls five times at 1-minute intervals at various points throughout the survey area. Compact speakers capable of broadcasting recorded bird calls in excess of 70 decibels were used during all surveys. Upon arriving at each calling point, Ms. Messett and Ms. Thomas listened and watched for cuckoos for 1 minute prior to playing the broadcast contact calls. Calling points were established approximately every 300 feet in riparian habitat that provided potentially suitable habitat for the western yellow-billed cuckoo. Generally following the southwestern willow flycatcher protocol, recorded vocalizations were also used to elicit a response from any potentially territorial

southwestern willow flycatchers. If no southwestern willow flycatchers were detected after the initial playing of the recorded vocalization, Ms. Messett occasionally replayed the recording depending on site conditions. As the least Bell's vireo survey protocol does not require the playback of least Bell's vireo vocalizations, recorded least Bell's vireo vocalizations were not used during the surveys. Any western yellow-billed cuckoo, southwestern willow flycatcher, or least Bell's vireo detected were recorded with a Global Positioning System (GPS) unit (i.e., Garmin Vista) or an iPad. Representative riparian habitat photographs were taken and are included in Appendix A, Site Photographs.

All surveys were conducted under optimal weather conditions and during early morning hours when bird activity is at its peak. All bird species detected during the surveys were recorded, including notable observations of special-status species or other birds (e.g., brown-headed cowbird [*Molothrus ater*]).

4.3.2. Pedestrian Surveys for General Wildlife

Biologists performed pedestrian surveys within the wildlife study area defined above to: (1) ground-truth the potentially suitable habitat maps developed during the literature review and (2) document any wildlife observations, including additional special-status species California condor and Pacific fisher. Pedestrian surveys were performed with binoculars to directly observe wildlife. Access roads were driven slowly in teams of two, with one biologist acting as an observer. Access roads were walked in areas of representative habitat. Active searches for reptiles and amphibians were conducted. Methods included lifting, overturning, and carefully replacing objects such as rocks, boards, and debris. Cover boards (Strain et al., 2009; Grover, 2006) were placed throughout the study area during Phase 1 of special-status salamander surveys and were checked for salamanders and other amphibians and reptiles during general wildlife surveys. Evening spot-lighting surveys were undertaken as road/safety conditions allow.

Biologists searched for signs of bats (staining on walls and guano piles) at the KR3 Powerhouse and associated out buildings. No sign of bat occupation was detected during the habitat assessment; therefore, acoustic surveys were not performed.

All wildlife species observed including special-status species and non-native invasive species were recorded in field notes and their location mapped onto an iPad. A complete list of wildlife species observed during the surveys is included in Appendix B, Wildlife Compendium.

4.3.3. Trail Camera Surveys

Biologists installed two trail cameras at locations likely to capture wildlife—specifically Pacific fisher—that may not be observable during pedestrian surveys. All cameras were able to take night photographs and video. Cameras were checked and memory cards were replaced during each survey visit in May, June, and July.

Cameras will be deployed for 1 to 2 years. Memory cards will be replaced every 6 months to download photos and document wildlife captured on camera. Camera placement will be reassessed after reviewing the second round of data.

5.0 DATA SUMMARY

5.1. SPECIES BACKGROUND

5.1.1. WESTERN YELLOW-BILLED CUCKOO

Western yellow-billed cuckoo (Distinct Population Segment [DPS]) is a federally and state-listed endangered species. The USFWS concluded that the western population was discrete from the eastern population based on geographic separation during the breeding season, morphological differences, and behavioral differences (USFWS, 2014a, 2014b). The western yellow-billed cuckoo generally occurs west of the crest of the Rocky Mountains, specifically in southwest British Columbia in Canada; Washington, Idaho, western Montana, Oregon, California, Nevada, southwestern Wyoming, Utah, western Colorado, Arizona, western New Mexico, and Texas in the United States; and Baja California Sur, Sonora, Sinaloa, western Chihuahua, and northwestern Durango in Mexico (USFWS 2014b). It winters in South America east of the Andes, primarily south of the Amazon Basin in southern Brazil, Paraguay, Uruguay, eastern Bolivia, and northern Argentina (Ehrlich, et al. 1992; American Ornithologists' Union, 1998; Johnson et al., 2008). The western yellow-billed cuckoo arrives in southern California between late May and early July, with most arriving in mid-June; it departs for its wintering grounds from mid-September to mid-October (Halterman et al., 2015). The peak of breeding activity lasts about 1 month and is typically in July; but in some years it can begin as early as May and can end as late as September (Laymon et al., 1997; Halterman, 1991, 2009; McNeil et al., 2013; Halterman et al., 2015).

The western yellow-billed cuckoo requires large tracts of riparian forest or woodland habitat along low-gradient rivers and streams in open riverine valleys that provide wide floodplain conditions (USFWS, 2014c). The optimal size of habitat patches for the species is generally greater than 200 acres in extent and has dense canopy closure and high foliage volume of willows and cottonwoods (Laymon and Halterman, 1989). Habitat between 100 acres and 200 acres, although considered suitable, are not consistently used by the species (Laymon and Halterman, 1989). Habitat patches from 50 to 100 acres in size are considered marginal habitat; sites less than 37 acres are considered unsuitable habitat (Laymon and Halterman, 1989). The species does not use narrow, steep-walled canyons (USFWS, 2014c). Sites with strips of habitat less than 325 feet in width are rarely occupied for nesting (USFWS, 2014c). Stopover and foraging sites can be similar to breeding sites but can be smaller in size (sometimes less than 10 acres in extent), narrower in width, and lack understory vegetation when compared to nesting sites (Laymon and Halterman, 1989; USFWS, 2014c). Minimum patch size for cuckoo occupancy is 12.4 acres; no cuckoos have been detected attempting to nest in patches this size or smaller in California or Arizona (Halterman et al., 2001; Johnson et al., 2010). They have also not been found nesting in narrow, linear habitat that is less than 33 to 66 feet wide (Halterman et al., 2015).

Optimal breeding habitat contains willow-dominated groves with dense canopy closure and well-foliaged branches for nest building with nearby foraging areas consisting of a mixture of cottonwoods and willows with a high volume of healthy foliage (USFWS,

2014c). Sites can be relatively dense, contiguous stands or irregularly shaped mosaics of dense vegetation with open areas (USFWS, 2014c). In California, habitat often consists of willows mixed with Fremont cottonwood (Halterman et al., 2015). Nest trees range from 10 feet to 98 feet in height and are an average of 35 feet in height. Nests are typically well-concealed in dense vegetation (Halterman, 2002; Laymon et al., 1997; McNeil, et al. 2013). Hydrologic conditions can vary from dry in some years to inundated in others (USFWS, 2014c). Humid conditions created by surface and subsurface moisture appear to be important habitat parameters for selection of nest sites (USFWS, 2014c). Multiple studies have found that cuckoo preferred nesting sites in younger riparian habitat that, when compared to mature woodlands, provided high productivity of invertebrate prey and reduced predator abundance (Layman, 1998; McNeil et al., 2013; Carstensen et al., 2015; Stanek and Stanek, 2012; Johnson et al., 2008). The dynamic transitional process of vegetation recruitment and maturity must be maintained to keep riparian habitat viable for this species over the long-term (USFWS, 2014b).

Western yellow-billed cuckoos historically bred throughout riparian systems in western North America from southern British Columbia, Canada, to northwestern Mexico (Hughes, 1999). In the past 90 years, the species' range in the western United States has contracted; the northern limit of breeding along the west coast is now in the Sacramento Valley, while the breeding limit in the western interior states is in southeastern Idaho (USFWS, 2013). Within the three states with the highest historical number of yellow-billed cuckoo, past riparian habitat losses are estimated to be 90 to 95 percent in Arizona, 90 percent in New Mexico, and 90 to 99 percent in California (Ohmart, 1994; USDOI, 1994; Noss et al., 1995; Greco, 2008). The primary factors threatening the western yellow-billed cuckoo are the loss and degradation of habitat for the species from altered watercourse hydrology and natural stream processes, livestock overgrazing, encroachment from agriculture, and conversion of native habitat to predominantly non-native vegetation. Additional threats to the species include the effects of climate change, pesticides, wildfire, and small and widely separated habitat patches (USFWS, 2014b). Compared to conditions historically, the areas currently used for nesting by the western yellow-billed cuckoo are very limited and disjunct. The breeding population is small, with 680 to 1,025 nesting pairs (350 to 495 pairs in the United States and 330 to 530 nesting pairs in Mexico) and with no site exceeding 60 nesting pairs. Estimating numbers is problematic because an individual can nest in more than one location in a single year, possibly causing overestimates of the number of nesting pairs (USFWS, 2014c). The current nesting population in California, based on surveys conducted in 2010, likely does not exceed 40 to 50 pairs found in only the three core locations. Core areas in California include (1) the Sacramento River between Colusa and Red Bluff, (2) the South Fork of the Kern River upstream of Lake Isabella, and (3) lower Colorado River (Laymon and Halterman, 1987).

This species formerly nested in the Los Angeles, San Gabriel, and the Santa Clara River systems (Allen and Garrett, 1996). Breeding persisted until at least 1952 in the San Gabriel River near El Monte (Long, 1993; Garrett and Dunn, 1981). No nesting of this species has been documented in Los Angeles County since the late 1950s, although breeding is still "conceivable" in remnant riparian habitat along the Santa Clara River (Allen and Garrett, 1996). In recent years, yellow-billed cuckoos occur in Los Angeles

County and elsewhere in the southern California coastal region only as rare migrants (Lehman, 2022; Unitt, 2004; Hamilton and Willick, 1996; Garrett and Dunn ,1981; Webster et al., 1980). Although no recent breeding observations have been confirmed in the southern California coastal region, multiple observations of yellow-billed cuckoos have been reported at some locations with suitable breeding habitat, including the lower Santa Clara River in Ventura County, the Whittier Narrows area in Los Angeles County, Prado Basin in Riverside and San Bernardino Counties, San Joaquin Marsh in Orange County, and San Luis Rey River near Oceanside in San Diego County. These observations generally consist of single birds and sometimes occur at times that suggest summering individuals rather than migrants (McCaskie and Garrett, 2013, 2014, 2015, 2016).

On August 15, 2014, the USFWS published a rule designating proposed critical habitat for the western DPS of the yellow-billed cuckoo (USFWS, 2014c). This proposed rule designated approximately 546,335 acres in Arizona, California, Colorado, Idaho, Nevada, New Mexico, Texas, Utah, and Wyoming. In California, proposed critical habitat includes Eel River (Humboldt County), Sacramento River (Colusa, Glenn, Butte, and Tehama Counties), Sutter Bypass (Sutter County), South Fork Kern River Valley (Kern County), Owens River (Inyo County), and Prado Flood Control Basin (Riverside County) and in two areas along the Colorado River (Imperial, Riverside, and San Bernardino Counties in California; Yuma, La Paz, and Mojave Counties in Arizona) (USFWS, 2014c). This proposed rule has not yet been finalized by the USFWS. The Project is not located within the proposed designated critical habitat area for this species.

5.1.2. SOUTHWESTERN WILLOW FLYCATCHER

Southwestern willow flycatcher is a federally and state-listed endangered species. It is one of four subspecies of the willow flycatcher (*Empidonax traillii*) (Sedgwick, 2000); the breeding range of the southwestern willow flycatcher includes southern California, southern Nevada, southern Utah, Arizona, New Mexico, western Texas, and extreme northwestern Mexico (i.e., Baja California del Norte, Sonora, and Chihuahua) (USFWS, 2002). The winter range of the southwestern willow flycatcher includes the tropical regions of southern Mexico, Central America, and northern South America (Sogge et al., 2010).

The southwestern willow flycatcher arrives in southern California in mid-May and departs for its wintering grounds in late July to mid-September. The spring migration of southwestern willow flycatcher is earlier than that of the northern subspecies of willow flycatchers (Unitt, 1984; 58 Fed. Reg. 140 p. 39495). As a result, the presence of more abundant subspecies that migrate through the range of the southwestern willow flycatcher during its breeding season complicates surveys for nesting southwestern willow flycatchers. Similarly, the other subspecies may pass through southern California during their fall migration in July and August while the southwestern willow flycatcher is still breeding; therefore, there is only a short period from June 15 to July 20 when the presence of a willow flycatcher in southern California can be determined to be southwestern subspecies of the willow flycatcher (USFWS, 2002).

The southwestern willow flycatcher occurs in dense riparian habitat along rivers, streams, and other wetlands. Typically, southwestern willow flycatcher nests in thickets of trees

and shrubs 13 to 23 feet or greater in height, with a dense understory and a high percentage of canopy cover (60 Fed. Reg. 38 p. 10694). The dense patches are often interspersed with small openings, open water, or small areas of shorter/sparse vegetation that create a mosaic of habitat that is not uniformly dense (USFWS, 2002). In almost all cases, slow-moving or still surface water and/or saturated soil is present during wet or non-drought years (USFWS, 2002). Plant species composition of low to mid-elevation sites ranges from monotypic stands to mixtures of broadleaf trees and shrubs including willows, cottonwoods, coast live oak, ash (*Fraxinus* sp.), alder (*Alnus* sp.), blackberry (*Rubus* sp.), and nettle (*Urtica* sp.) (USFWS, 2002). They can also nest in riparian habitats dominated by a mix of native and introduced species, such as Russian olive (*Elaeagnus angustifolia*) and tamarisk (*Tamarix* sp.) or in monotypic stands of these introduced species; however, southwestern willow flycatchers rarely nest in giant reed (*Arundo donax*) (USFWS, 2002). Overall, nest site selection appears to be driven more by plant structure than species composition (Sogge et al., 2010).

In California, the southwestern willow flycatcher was once considered common in all lower elevation riparian areas in the southern third of the state including the Los Angeles Basin, Riverside/San Bernardino area, and San Diego County (Wheelock, 1912; Willett, 1912; Grinnell and Miller, 1944; Unitt, 1984, 1987). The primary cause of the southwestern willow flycatcher's decline is the loss and modification of riparian habitat (USFWS, 2002). With the increase in urbanization and agricultural development, these systems have declined or have been further degraded by reduction in water flow, interruption of the natural hydrogeological events or cycles, physical modifications to streams, removal of riparian vegetation, invasion by non-native invasive plant species, livestock grazing, and recreation (USFWS, 2002). Additionally, agriculture and certain other types of development can increase foraging habitat for brown-headed cowbirds in proximity to southwestern willow flycatcher breeding habitat, which can increase nest parasitism (USFWS, 2002). Flycatcher habitat and their populations are threatened further with additional stressors such as introductions of tamarisk leaf beetle (*Diorahbda carninulata*), which defoliates tamarisk, and shot hole borer beetle (*Euwallacea* sp.)/Fusarium (*Fusarium euwallaceae*), a beetle/fungi complex that causes tree die-off (USFWS, 2017). All of these threats to the flycatcher and its habitat vary in severity over the southwest; and, at any given location, multiple stressors are likely to be at work, with cumulative and synergistic effects (USFWS, 2017).

On January 3, 2013, the USFWS published a Revised Final Critical Habitat for the southwestern willow flycatcher (USFWS, 2013). This final rule designated 208,973 acres (1,227 stream miles) in 24 Management Units on a combination of federal, state, Tribal, and private lands in California, Nevada, Utah, Arizona, and New Mexico. In California, critical habitat was designated in Inyo, Kern, Los Angeles, Riverside, Santa Barbara, San Bernardino, San Diego, and Ventura Counties. The Project is not located within the 2013 Revised Critical Habitat for the southwestern willow flycatcher.

5.1.3. LEAST BELL'S VIREO

Least Bell's vireo is a federally and state-listed endangered species. It is one of four subspecies of the Bell's vireo (*Vireo bellii*); this subspecies is the westernmost of the four

subspecies, breeding entirely in southwestern California and northwestern Baja California, Mexico. Although not well known, the winter range of the least Bell's vireo is believed to be the west coast of Central America from southern Sonora, Mexico, south to northwestern Nicaragua, including the cape region of Baja California, Mexico (Brown, 1993). The least Bell's vireo arrives in southern California from mid-March to early April and departs for its wintering grounds in August to mid-September.

The least Bell's vireo is a small, gray migratory songbird that is about 4.5 to 5 inches long. It has short, rounded wings and a short, straight bill for catching insects. Feathers are gray above and pale below. "The least Bell's vireo is easily recognized on the breeding grounds by its distinctive song" (Coues, 1903). Males establish and defend territories through counter-singing, chasing, and sometimes physically confronting neighboring males (USFWS, 1998).

Least Bell's vireos consume a "wide variety of insects including bugs, beetles, grasshoppers, moths, and particularly caterpillars" (Chapin, 1925; Bent, 1940). They obtain prey through foliage gleaning (i.e., picking prey from leaves or bark) and through hovering (i.e., removing prey from vegetation surfaces while fluttering in the air) (Salata, 1983; Miner, 1989). Vireos will forage in all layers of the canopy but tend to concentrate their foraging in the lower to mid-strata from 9 to 18 feet in height (Miner, 1989). Vireos forage in both riparian and adjacent upland habitat (Salata, 1983; Kus and Miner, 1987).

The least Bell's vireo is an obligate riparian species (i.e., nests exclusively in riparian habitat) and prefers early-successional habitat. On its breeding grounds, it typically inhabits structurally diverse woodlands along watercourses. In California, least Bell's vireo habitat consists of southern willow scrub, mule fat scrub, sycamore alluvial woodland, coast live oak riparian forest, arroyo willow riparian forest, and cottonwood bottomland forest (Faber et al., 1989). Although least Bell's vireos typically nest in willow-dominated areas, plant species composition does not appear to be as important in nest site selection as habitat structure (USFWS, 1998). The most critical factor in habitat structure is the presence of a dense understory shrub layer from approximately 3 to 6 feet aboveground, where nests are typically placed, and a dense stratified canopy for foraging (Goldwasser, 1981; Gray and Greaves, 1981; Salata, 1981, 1983; RECON, 1989). This structure is typically met by willows that are between 4 and 10 years of age (RECON, 1988; Franzreb, 1989). As stands mature, the tall canopy tends to shade out the shrub layer, making the sites less suitable for nesting; however, least Bell's vireos will continue to use such areas if patches of understory exist (USFWS, 1998). Vireo nest placement tends to occur in openings and along the riparian edge, where exposure to sunlight allows the development of shrubs (USFWS, 1998). The riparian ecosystems required by the vireo are dynamic systems; and the scouring of vegetation during periodic floods is required to create the low, dense vegetation favored by the bird (51 Fed. Reg. 85 p. 16474).

Males arrive on the breeding grounds about 1 week prior to females, and older birds arrive before first-year birds. Pair formation occurs within a few days, and pairs build a nest together over the next 4 to 5 days. The typical clutch size for least Bell's vireo is four eggs, which are incubated for approximately 14 days. The young remain in the nest for

approximately 10 to 12 days. Adults continue to care for the young for at least 2 weeks post-fledging, as the family groups forage over larger areas. The largest causes of least Bell's vireo nest failure are nest parasitism by brown-headed cowbird and egg predation; nests also fail due to vegetation clearing, trampling by humans and cattle, ant infestations, and rainstorms. Least Bell's vireo will make up to five nesting attempts per season, assuming adequate energy resources; typically, a pair will successfully fledge young from one to two nests per season. Few nests are initiated after mid-July (USFWS, 1998). The least Bell's vireo often shows a strong site fidelity, returning not just to the same drainage and the same territory but even to the same tree where it previously nested. However, vireos may move locations due to habitat loss or failure to attract a mate (USFWS, 1998).

The least Bell's vireo was formerly considered a common breeder in riparian habitats throughout the Central Valley and other low-elevation riverine systems throughout California and Baja California, Mexico (USFWS, 1998). At the time of its listing, the least Bell's vireo had been eliminated from 95 percent of its former range (51 Fed. Reg. 85 p. 16474). The decline of least Bell's vireo is attributed to the widespread loss of riparian woodlands coupled with the increase in brown-headed cowbirds (51 Fed. Reg. 85 p. 16474). Loss of riparian habitat has been attributed to flood control and water development projects, agricultural development, livestock grazing, spread of invasive exotic plant species, degradation of habitat by off-road vehicles, and urban development. With the implementation of intensive brown-headed cowbird management programs, the least Bell's vireo numbers have dramatically increased (USFWS, 1998). Vireos have also expanded their range into areas where they were formerly extirpated.

On February 2, 1994, the USFWS issued their final determination of critical habitat for the least Bell's vireo, identifying approximately 37,560 acres as critical habitat in Santa Barbara, Ventura, Los Angeles, San Bernardino, Riverside, and San Diego Counties (59 Fed. Reg. 22 p. 4845). The Project is not located in designated critical habitat for this species.

5.1.4. California Condor

The California condor is a federally and state-listed endangered species. It has broad habitat and climatic tolerances. Suitable habitat for the condor includes adequate food supply, open areas to locate food, and reliable air movements to allow for extending soaring (Bloom, 2009). Foraging habitat consists of vast expanses of open savannah and grassland, including potreros (cattle ranches or pastures) within chaparral with cliffs, large trees, and snags that are often separated by far distances from the nesting sites. Roosting habitat is located near important foraging grounds, often near a previously discovered carcass. Nesting habitat ranges from chaparral to forested montane regions, including redwood forests. The California condor nests in caves, crevices, and large ledges on high sandstone cliffs. Expending very little energy, these scavengers soar on thermal updrafts and wind currents until they spot potential food sources. Breeding birds typically forage within 31 to 43.5 miles) of their nesting areas, with core foraging areas ranging from 2,500 to 2,800 square kilometers (970 to 1,100 square miles) (Bloom, 2009).

In the early 1980s, the total population for this species was estimated at fewer than 20 individuals. By the end of 1986, all but two condors had been taken into captivity. On April 19, 1987, the last wild condor was captured and taken to the San Diego Wild Animal Park (Bloom, 2009). Decline of this species has been attributed to many factors, including reduction or modification of foraging habitat, decrease in available food, disturbance around nest sites, shooting, poisoning, pesticide residues, and general senescence (growing old; aging) of the species (Garrett and Dunn, 1981). A captive breeding program was initiated, and birds have since been reintroduced into the wild at the Sespe Reserve, at Big Sur, and in the Grand Canyon. Currently, there are over 400 condors in the world population (both captive and wild), 128 of whom are in California (CDFW, 2015). Due to the combination of captive breeding and limited wild nest reproduction, the condor population is steadily increasing (Bloom, 2009). In more recent years, the greatest cause of death is believed to be lead poisoning from eating carcasses with lead shot in them. Most recently, the California has enacted the Ridley-Tree Condor Preservation Act, which bans lead shot ammunition within the range of the California condor (Bloom, 2009).

Nesting California condors, prior to the use of radio telemetry in the wild, were not known to travel more than 50 to 75 kilometers (31 to 43.5 miles) from an active nest. As opportunistic scavengers, California condors may travel tremendous distances in search of food (Bloom, 2009); in some instances, they can travel up to 225 kilometers (about 140 miles; Meretsky and Snyder, 1992). As a resident, non-migratory species, the California condor has the largest home range of any terrestrial bird in North America studied to date.

Condors apparently avoid valley floors for foraging; they rarely fly over valley floor habitat and almost never land there (Bloom, 2009). By example, from 1982 to 1987, no condors with transmitters were known to cross the Central Valley. Instead, all birds followed the foothills and mountains surrounding the valley floor to move from the Sierra Nevada foothills to the Coast Ranges and back. Observations of flying condors prior to 1987 indicate that, on the few instances that they were known to have flown over valley floor habitat the birds were usually flying high over the landscape, probably at an altitude of over 1,000 feet. During these flights, the condors rarely, if ever, landed and their movements appeared transitory.

The closest recorded occurrence of a condor is approximately 30 miles northeast of the northern end of the study area. This occurrence is historical from 1978 at the Blue Ridge Condor Area. The most recent recorded occurrence of a condor in the vicinity of the study area is from 2013 and is approximately 50 miles south on Tejon Ranch. Based on habitat requirements for nesting, the California condor is not expected to breed in the study area. Marginal foraging habitat occurs on the Project. Potentially suitable foraging habitat occurs in the grassland areas in the southern portion of the study area.

On September 24, 1976, the USFWS designated critical habitat for the condor consisting of 9 areas that encompass approximately 600,000 acres (41 Fed. Reg. 187 p.41914). These areas occur in the following counties: Tulare, San Luis Obispo, Ventura, Kern, Santa Barbara, and Los Angeles. The Sespe-Piru, Matilija, Sisquoc-San Rafael, and Hi Mountain-Beartrap condor areas were considered critical for nesting and related

year-long activity and the Mt. Pinos and Blue Ridge condor areas were considered critical for roosting. Tejon Ranch, Kern County rangelands, and Tulare County rangelands were considered important for feeding and related activities. Tejon Ranch and the Bitter Creek Wildlife Refuge were considered to be important because they contained the only significant feeding habitat remaining in close proximity to the Sespe-Piru condor nesting area (41 Fed. Reg. 187 p.41914). The Project is not located within designated critical habitat for this species.

5.1.5. PACIFIC FISHER WEST COAST DPS

The fisher is a medium-sized forest-dwelling carnivore whose primary habitat in the western United States is dense coniferous forest, usually with a deciduous component and abundant physical structure in the form of large trees, snags, and logs (Zielinski et al., 2013). The southern Sierra Nevada DPS of the fisher is an isolated population in the southern Sierra Nevada. In the Project region, USFWS proposed critical habitat occurs east of the Project Area in the Kern Plateau (Unit 1); and west of the Project Area in the southwestern tip of the Sierra Nevada and Greenhorn Mountains—between the Kern River and Bear Creek in the Tule River watershed (Unit 2) (USFWS, 2022). No proposed critical habitat occurs in the Project Area. Fisher has not been documented in the Project Area (CDFW, 2023).

The USFWS-proposed critical habitat units were determined based on modeled suitable, high-quality denning habitat[2] that includes intermixed foraging and dispersal areas. Female fishers have the strictest habitat requirements, and they raise their young alone; therefore, maintaining and increasing carrying capacity for breeding females is essential to sustaining and recovering the fisher population (Spencer et al., 2016). Denning habitat used by females to raise young appears to be a subset of resting habitat (used by both sexes year-round) and is restricted to forest stands with dense canopy cover (greater than 60 percent), structural diversity, large trees, and a moderate intermix with black oaks (*Quercus kelloggii*). Resting typically occurs in the largest available live trees (e.g., conifers greater than or equal to 35 inches and hardwoods greater than or equal to 25 inches), snags, or logs that provide cavities, platforms, or other deformities used by resting fishers (USFWS, 2022, Spencer et al., 2016).

In addition to core denning habitat, the Conservation Biology Institute's southern Sierra Nevada Fisher Conservation Strategy (Spencer et al., 2016) identifies least risky potential linkages based on expert assumptions about fisher dispersal relative to vegetation, terrain, and other factors used by fisher to disperse between critical habitat units. Linkages identified by the institute are not included in USFWS proposed critical habitat (USFWS, 2022, Spencer et al., 2016). Genetic analyses suggest that female fishers primarily disperse through dense forest stands with large trees; however, fisher experts expect that shrubs (e.g., chaparral) may provide sufficient hiding and escape cover for dispersing male fishers in non-forested portions of linkage areas (Spencer et al., 2016). The closest identified linkage (linking Critical Habitat Units 1 and 2) occurs approximately

[2] Such habitat provides structural features for birthing kits, raising kits, protection from adverse weather conditions, facilitation of safe movement, sites to rest and thermoregulate, foraging opportunities, and cover to reduce predation risk for adults and young (USFWS, 2022).

12 miles north of the Project and crosses Kern River (Spencer et al., 2016). No identified linkages occur in the Project Area.

On the Project, Salmon Creek diversion, Corral Creek diversion, and forested areas adjacent to Kern River may contain marginal foraging and resting habitat for dispersing fisher from Critical Habitat Unit 1 east of the Project. These areas contain riparian habitat with high canopy cover (mostly greater than 60 percent) that fisher require for movement. Dens are primarily in mixed-coniferous and coniferous-hardwood stands with dense canopy cover, a moderate intermix of California black oaks, on steep slopes (approximately 20 to 50 percent slopes)—habitat elements lacking on the Project.

5.2. FIELD SURVEY RESULTS

5.2.1. RIPARIAN BIRDS

No western yellow-billed cuckoo, southwestern willow flycatcher or least Bell's vireo were observed or detected in the survey area during the non-protocol surveys. A summary of the riparian bird survey data is presented below in Table 5.2-1.

Table 5.2-1. Riparian Bird Survey Results

Survey Number	Date	Survey Area	Time (Start/End)	Surveyor	Weather Conditions			Special-Status Riparian Bird Species Observed or Detected
					Temperature (°F) (Start/End)	Wind (mph) (Start/End)	Cloud Cover (%) (Start/End)	
1	May 15, 2023	Kern River	0630/1130	Messett and Thomas	62/87	3–4/3–4	Clear/5	No special-status riparian bird species observed or detected.
1	May 16, 2023	Cannel Creek and Corral Creek	0610/1155	Messett and Thomas	59/83	1–2	5/50	No special-status riparian bird species observed or detected.
1	May 17, 2023	Salmon Creek and Gold Ledge Creek	0630/1140	Messett and Thomas	56/87	1–2/2–3	Clear/Clear	No special-status riparian bird species observed or detected.
1	May 18, 2023	Forebay	0715/0830	Messett and Thomas	63/76	2–3/2–3	Clear/Clear	No special-status riparian bird species observed or detected.
2	June 21, 2023	Salmon Creek and Gold Ledge Creek	0700/1145	Messett and Thomas	65/76	0–1/0–1	Clear/Clear	No special-status riparian bird species observed or detected.
2	June 22, 2023	Corral Creek, Cannel Creek	0700/1230	Messett and Thomas	53/76	0–1/1–2	Clear/Clear	No special-status riparian bird species observed or detected.
2	June 23, 2023	Kern River and Forebay	0700-1135	Messett and Thomas	60/75	0–1/1–2	Clear/Clear	No special-status riparian bird species observed or detected.
3	July 10, 2023	Salmon Creek, Gold Ledge Creek, and Kern River	0615/1200	Messett and Thomas	65/84	0–1/2–3	Clear/Clear	No special-status riparian bird species observed or detected.

Survey Number	Date	Survey Area	Time (Start/End)	Surveyor	Weather Conditions			Special-Status Riparian Bird Species Observed or Detected
					Temperature (°F) (Start/End)	Wind (mph) (Start/End)	Cloud Cover (%) (Start/End)	
3	July 11, 2023	Corral Creek, Cannel Creek, and Kern River	0605/1150	Messett and Thomas	73/89	2–3/4–5	10/Clear	No special-status riparian bird species observed or detected.
3	July 12, 2023	Forebay and Kern River	0630/1145	Messett and Thomas	74/91	1–2/3–4	10/5	No special-status riparian bird species observed or detected.

% = percent; °F = degrees Fahrenheit; mph = miles per hour

5.2.2. BATS

No sign of bat roosting was observed in the KR3 Powerhouse and associated out buildings, bridges, overhanging adits, or visible rock crevices along Project access roads. SCE field staff members were consulted during surveys to inquire about any bat observations in any Project facilities. They reported no roosting bat observations on Project facilities in the Project Area.

In general, occurrence data on bats in the Kern River Valley area is lacking (Noel, 2021). Noel (2021) has documented species and seasonal occurrence of bats along the upper and lower Kern River. Noel's (2021) lower Kern River sites were located below the Kern Canyon mouth and extended on the valley floor a distance of approximately 24 miles. The upper Kern River sites were located from Democrat Station, approximately 15 miles below Lake Isabella, to Brush Creek, approximately 18 miles north of the lake. Blood (2023) has museum records for bats in the Project Area. These sources have documented 15 species of bats from two families: Molossidae and Vespertilionidae.

These species include the following Vespertilionids: hoary bat (*Aeorestes cinereus*), pallid bat (*Antrozous pallidus*), Townsend's big-eared bat (*Corynorhinus townsendii*), big brown bat (*Eptesicus fuscus*), spotted bat (*Euderma maculatum*), western red bat (*Lasiurus frantzii*), California myotis (*Myotis californicus*), western small-footed myotis (*Myotis ciliolabrum*), long-eared myotis (*Myotis evotis*), fringed myotis (*Myotis thysanodes*), long-legged myotis (*Myotis volans*), Yuma myotis (*Myotis yumanensis*), and canyon bat (*Parastrellus hesperus*). Two molossids have been recorded and include western bonneted bat (*Eumops perotis*) and Brazilian free-tailed bat (*Tadarida brasiliensis*).

Corben (2001) surveyed the national forests in California for western red bat. The survey included the lower and upper Kern River. The lower Kern River sites were between Democrat Station and Bodfish along Kern River Canyon Road. The upper Kern River sites started north of Lake Isabella just above where the South Fork of the Kern River joins the lake to above Fairview end Road's End along Mountain Highway 99. The surveys took place on June 6 and 7, 2001. He detected the following species at the lower Kern sites, which were all below Bodfish: pallid bat, big brown bat, California myotis, western small-footed myotis, long-eared myotis, canyon bat, and Brazilian free-tailed bat. At the upper Kern sites, which were all below the Project site, he detected all of the above plus Yuma myotis, Townsend's big-eared bat, hoary bat, western red bat, and *western bonneted bat*.

Of the above, fringed myotis and Townsend's big-eared bat are Sequoia National FSCC.

The following species are California Species of Special Concern: pallid bat, Townsend's big-eared bat, spotted bat, western red bat, and western bonneted bat.

Based on these studies it appears that at least 15 species of bats occur, at least seasonally, along the Kern River. Brief biological sketches of each species are Found in Appendix C, Bat Natural History Summary.

Family Vespertilionidae

Hoary bat: Occurrence in Study Area: The hoary bat was recorded by Noel (2021) from the upper Kern River sites in both summer and winter. The hoary bat was recorded more often at the lower Kern River sites. Corben (2001) recorded this species from the upper Kern River site which is 1 mile south of Camp 3.

Pallid bat: Occurrence in Study Area: Noel (2021) demonstrated that the pallid bat only occurs in the Central Valley floor outside and below the Kern River Valley and so is not a species to be considered further with regard to the relicensing of the Project. Corben (2001) also only recoded the pallid bat at the lower Kern River sites.

Townsend's big-eared bat: Occurrence in Study Area: Noel (2021) did not record Townsend's big-eared bat as part of the study. Corben (2001) recorded Townsend's big-eared bat in the upper Kern River site at the northeast corner of Lake Isabella.

Big brown bat: Occurrence in Study Area: Noel (2021) recorded the big brown bat in winter and summer from the upper Kern River site, but like the hoary bat, it was recorded more often at the lower Kern River sites. Corben (2001) recorded the big brown bat at the lower and upper Kern River sites.

Spotted bat: Occurrence in Study Area: Noel (2021) recorded this species, but the detection was outside the parameters of the study and so was not analyzed. A single individual was recorded at an upper Kern River site at the Cannell trail. Corben (2001) did detect this species.

Western red bat: Occurrence in Study Area: Noel (2021) had very few detection and only at the lower Kern River site. Corben (2001) recorded western red bat at the upper Kern River site at the northeast corner of Lake Isabella. These two studies demonstrate that red bats are not using the upper Kern River or the study area.

California myotis: Occurrence in Study Area: Noel (2021) recorded the California myotis in both winter and summer. The study recorded this species more often at the upper Kern River sites and most often in the summer. Corben (2001) recorded California myotis at the upper and lower Kern River sites.

Western small-footed myotis: Occurrence in Study Area: Noel (2021) recorded the western small-footed myotis at both the lower and upper Kern River sites, mostly during the summer and at the upper Kern River sites. Corben (2001) recorded this species at the lower Kern River sites. It is unclear from the report if this species was recorded at the upper sites.

Long-eared myotis: Occurrence in Study Area: Noel (2021) recorded this species only once in the winter at an upper Kern River site. Corben (2001) recorded this species at the lower Kern River sites. It is unclear from the report if this species was recorded at the upper sites.

Fringed myotis: Occurrence in Study Area: Noel (2021) recorded this species from the upper Kern River in the summer. Very few calls were captured. Corben (2001) only recorded this species from the upper Kern River sites.

Long-legged myotis: Occurrence in Study Area: Noel (2021) had very few sections of this species and only at the upper Kern locations in October. Corben (2001) detected this species in the upper Kern River sites.

Yuma myotis: Occurrence in Study Area: Noel (2021) recorded this species at the lower and upper Kern River sites. The majority of detections were during the summer. Corben (2001) only detected this species at the upper Kern River sites.

Canyon bat: Occurrence in Study Area: Noel (2021) recorded this species at the lower and upper Kern River sites. The majority of detections were during the summer. Corben (2001) recorded this species at the lower and upper Kern River sites.

Family Molossidae

Western bonneted bat (*Eumops perotis*): Occurrence in Study Area: Noel (2021) recorded the western bonneted bat at the lower and upper Kern River sites in the winter and summer. Corben (2001) recorded this species only at the upper sites.

Brazilian free-tailed bat: Occurrence in Study Area: Noel (2021) recorded this species in the lower and upper Kern River sites in the winter and summer. This species was much more numerous in the summer and was the most recorded species in the study. Corben (2001) also recoded this species at the lower and upper sites.

Notes on Flight and Foraging

It has been suggested that the flumes provide foraging habitat and are a source of insects. The open flumes may provide a source of aquatic insects, but compared to the amount of surrounding habitat, the flumes would be a minor source of insect prey. The open flumes are designed with numerous cross bars over the upper surface. The cross bars most likely create a hinderance to bats to forage over the immediate flume surface but would not hinder their foraging above the flumes. The cross bars also present a barrier to bats using the flumes as a source of drinking water, even for the clutter specialist species (i.e., those species with low aspect ratio wings and slow fluttery flight).

There is a close association between wing size and shape and a bat's flight/foraging behavior (Farney and Fleharty, 1969; Findley et al., 1972; Lawlor, 1973; Norberg, 1994; Struthsaker, 1961; Vaughan, 1959, 1966). The shape of a bat's wing is commonly expressed through the use of the aspect ratio or aspect ratio index (Findley et al., 1972). These numbers express the wing's relative width to length. A high value for the aspect ratio denotes a relatively long and narrow wing. Bats with high aspect ratio wings tend to forage at high altitude and fly at fast speeds. They use direct flight and do not usually make dramatic turns or maneuvers.

Molossid bats, such the western bonneted bat and the Brazilian free-tailed bats have high aspect ratio wings and tend to feed in open, clear air ways. These two species would be

more likely to forage above the flumes and above the riparian canopy or through open riparian corridors rather that in and around the open flumes.

Low aspect ratio indicates a relatively short and broad wing. Bats with low aspect wings are slow maneuvering flyers that forage at low altitudes about trees and shrubs. They display highly erratic and maneuverable flight patterns. The canyon bat and Yuma myotis are good examples of low aspect ratio foragers. Other species such as the pallid bat and the long-eared myotis will also glean prey from the surface of the ground, while bats, like the big brown bat, are known to forage over open riparian corridors. The vespertilionids that occur along the Kern River present a variety of flight behaviors and foraging behaviors.

5.2.3. CAMERA SURVEYS

During the initial habitat assessment effort on October 28, 2022, one camera was placed along Salmon Creek, just upstream of the flume, and a second camera was placed along Corral Creek under a walking bridge which faced a trail. During a second habitat assessment effort on November 17, 2023, the camera locations were checked, and the camera placed along Corral Creek had been stolen. New cameras were purchased, and one was placed at a new location along Corral Creek further downstream. Wildlife species detected on the cameras included California ground squirrel (*Otospermophilus beecheyi*), western gray squirrel (*Sciurus griseus*), desert cottontail (*Sylvilagus audubonii*), common gray fox (*Urocyon cinereoargenteus*), and black bear (*Ursus americanus*). Additional species observed on the cameras included domestic dog (*Canis lupus familiaris*) and domestic cow (*Bos taurus*).

5.2.4. ADDITIONAL OBSERVATIONS

This section describes special-status wildlife that occur or may potentially occur in the Project Vicinity. This section addresses only special-status terrestrial wildlife species. Amphibians and reptiles that use aquatic habitats are included in this section because of their utilization of adjacent terrestrial habitats. Special-status wildlife species are those species that are considered California Species of Special Concern by the State of California, categorized as Sensitive by the USFS and/or the Bureau of Land Management, or as a Species of Conservation Concern by the USFWS.

Table 5.2-2 provides a list of special-status wildlife species evaluated for their potential to occur in the Project Vicinity. Species listed in the table are categorized as known to occur or having the potential to occur in appropriate habitat. Table 5.2-2 summarizes pertinent information for each bird species, including status and preferred habitat, with information on the location of the occurrence, if applicable.

Table 5.2-2. Special Status Wildlife Species

Scientific/ Common Name	Federal Status	State Status	Habitat	Likelihood for Occurrence/ Occurrence Notes
Insects				
Bombus crotchii Crotch bumble bee	–	Candidate Endangered	Occurs from coastal California east to the Sierra-Cascade crest and south into Mexico. Food plant genera include *Antirrhinum, Phacelia, Clarkia, Dendromecon, Eschscholzia,* and Eriogonum.	May occur, but the potential is low. The Project is within the historic range for this species; however, the last known occurrence in the Project Vicinity was in 1993. Not observed during general biological surveys in 2023.
Plebulina emigdionis San Emigdio blue butterfly	USFS_S	–	Found in desert canyons and along riverbeds in Inyo, Kern, Los Angeles, and San Bernardino Counties. Host plant is *Atriplex canescens*; maybe *Lotus purshianus* also.	May occur, but the potential is low. Suitable habitat is present in the Project Vicinity; however, the most recent occurrence is 10 miles south of the Project near Weldon. Not observed during general biological surveys in 2023.
Amphibians				
Batrachoseps bramei Fairview slender salamander	USFS_S	–	Known only from the Upper Kern River Canyon and west side of Lake Isabella, within metamorphic rock outcrops in a variety of habitats, including chaparral and mixed oak and conifer woodland. Generally found beneath rocks, often on talus slopes. Occasionally found beneath logs, river gravel, and leaf litter.	**Present.** A total of three individuals were observed at two locations within the study area during biological surveys by Psomas in 2023. Two individuals were observed in a canyon across from Fairview Dam and one individual was observed near Adit 16/17. There is suitable habitat throughout the Project Area and vicinity.

Scientific/ Common Name	Federal Status	State Status	Habitat	Likelihood for Occurrence/ Occurrence Notes
Batrachoseps robustus Kern Plateau salamander	–	–	Found only in the semi-arid Kern Plateau and Scodie Mountains. Frequents Jeffery pine/red fir, lodgepole pine, and riparian scrub. Found under rocks, bark fragments, logs, and within and under wet logs, especially in spring and seep areas.	May occur. There is suitable habitat in the Project Vicinity along Salmon and Corral Creeks. However, these salamanders are known to occur at higher elevations on the Kern Plateau in Salmon Creek. Not observed during salamander surveys in 2023.
Batrachoseps simatus Kern Canyon slender salamander	USFS_S	CDFW_ST	A semifossorial species that occurs in isolated colonies along stream courses and on ridges and hillsides. Cool, moist, north-facing slopes and shaded narrow tributary canyons seem to be favored. They are found in talus slopes and under logs and other surface objects especially after rains. Frequents streamside vegetation of willows and cottonwoods, and slopes grown to interior live oak, canyon oak, pine, and mixed chaparral.	Not likely to occur. No known occurrences of this species north of Lake Isabella. Suitable chaparral and woodland habitat exists within Project Vicinity only at existing road crossings. Not observed during salamander surveys in 2023.
Batrachoseps altasierrae Greenhorn Mountains slender salamander	–	–	Known from high elevations in the Greenhorn Mountains west of the Project Area (and one location east of the Project Area in the western Kern Plateau). Most populations are found in mesic areas (e.g., swales, drainages, etc.) with an overstory of trees or shrubs and abundant rocks, litter, or woody debris in coniferous forests containing a mixture of pine, fir, and incense cedar (*Calocedrus decurrens*).	Not likely to occur. This species is not known from the Project Area. In the study area, potentially suitable habitat for this species overlaps that of the Fairview salamander. Not observed during salamander surveys in 2023.

Scientific/ Common Name	Federal Status	State Status	Habitat	Likelihood for Occurrence/ Occurrence Notes
Rana boylii foothill yellow-legged frog	USFS_S BLM_S	CDFW _SSC	Found in partly shaded, shallow streams and riffles with a rocky substrate in a variety of habitats. Needs at least some cobble-sized substrate for egg-laying. Needs at least 15 weeks to attain metamorphosis.	May occur, but the potential is low. Records along Kern River are all prior to 1960. Suitable aquatic habitat in the vicinity at the NFKR, and in the upstream wetted portions of the channel. This species is addressed in further detail in a separate study plan. Project is outside designated critical habitat.
Rana muscosa southern mountain yellow-legged frog	USFWS_FE	CDFW_SE	This species prefers sunny riverbanks, meadow streams, isolated pools, lake borders, and rocky stream courses in the mountains of southern California. In southern California, populations are restricted to streams in Ponderosa pine, montane hardwood-conifer, and montane riparian habitats. They are always found within a few feet of water. They appear to prefer open stream and lake margins that gently slope. They seem to be most successful where predatory fish are absent. Tadpoles may require 2 to 4 years to complete their aquatic development.	May occur, but the potential is low. Project site does not contain suitable habitat. The nearest known location is approximately 14.6 miles southeast of the Project Vicinity. This species is addressed in further detail in a separate study plan. Project is outside designated critical habitat.
Reptiles				
Anniella campi southern Sierra legless lizard	USFS_S	CDFW _SSC	Found in desert canyons and springs along western edge of the Mojave Desert in Kern and Inyo Counties. Microhabitat of this species is poorly known. Other legless lizard species occur in sparsely vegetated areas with moist, loose soil. Often found underneath leaf litter, rocks, and logs.	May occur. Suitable habitat in chaparral and woodland habitats adjacent to Project Vicinity. Know to occur just north of the City of Kernville. Not observed during general biological surveys in 2023.

Scientific/ Common Name	Federal Status	State Status	Habitat	Likelihood for Occurrence/ Occurrence Notes
Anniella spp. California legless lizard	–	CDFW _SSC	Occurs from Contra Costa County south to San Diego, within a variety of open habitats. Found in a variety of habitats; generally, in moist, loose soil. They prefer soils with a high moisture content.	High potential to occur. Suitable habitat in chaparral and woodland habitats adjacent to Project Vicinity. Not observed during general biological surveys in 2023.
Actinemys marmorata northwestern pond turtle	USFWS_FCT USFS_S BLM_S	CDFW _SSC	A thoroughly aquatic turtle of ponds, marshes, rivers, streams, and irrigation ditches, usually with aquatic vegetation, below 6,000 feet elevation. Needs basking sites and suitable (sandy banks or grassy open fields) upland habitat up to 1,500 feet from water for egg-laying.	**Present.** One individual was observed in Corral Creek during pond turtle surveys by Psomas in 2023. The Project contains suitable habitat within Salmon Creek, Corral Creek, Cannell Creek, and the NFKR. This species is addressed in further detail in a separate study plan.
Birds				
Accipiter gentilis northern goshawk	USFS_S BLM_S	CDFW _SSC	Found within, and in vicinity of, coniferous forest. Uses old nests and maintains alternate sites. Usually nests on north slopes, near water. Red fir, lodgepole pine, Jeffrey pine, and aspens are typical nest trees.	May occur, but the potential is low for nesting and moderate for foraging. Suitable coniferous habitat in and adjacent to Project Vicinity. Not observed during general biological surveys in 2023.
Agelaius tricolor tricolored blackbird	USFWS_BCC BLM_S	CDFW_ST CDFW _SSC	A highly colonial species, most numerous in Central Valley and vicinity. Largely endemic to California. Requires open water, protected nesting substrate, and foraging area with insect prey within a few kilometers of the colony.	May occur, but the potential is low for nesting and foraging. No suitable open water, marsh, limited cattail nesting habitat in Project Vicinity. Not observed during general biological surveys in 2023.

Scientific/ Common Name	Federal Status	State Status	Habitat	Likelihood for Occurrence/ Occurrence Notes
Buteo swainsoni Swainson's hawk	USFWS_BCC BLM_S	CDFW_ST	Breeds in grasslands with scattered trees, juniper-sage flats, riparian areas, savannahs, and agricultural or ranch lands with groves or lines of trees. Requires adjacent suitable foraging areas such as grasslands, or alfalfa or grain fields supporting rodent populations.	May occur during migration, but the potential is low for nesting and foraging. Outside the current known breeding range. No suitable grassland habitat in Project Vicinity. Not observed during general biological surveys in 2023.
Coccyzus americanus occidentalis western yellow-billed cuckoo	USFWS_FT USFS_S USFWS_BCC BLM_S	CDFW_SE	A riparian forest nester, along the broad, lower flood-bottoms of larger river systems. Nests in riparian jungles of willow, often mixed with cottonwoods, with lower story of blackberry, nettles, or wild grape.	May occur, but the potential is low for nesting and foraging. There is limited suitable riparian habitat within the Project Vicinity. However, this species is known to nest in areas where suitable riparian habitat is present around Lake Isabella, the Kern River Preserve, and the South Fork Wildlife Area. Not observed during riparian bird surveys in 2023. Project is outside designated critical habitat.
Cypseloides niger black swift	USFWS_BCC	CDFW _SSC	Occurs within the coastal belt of Santa Cruz and Monterey Counties; central and southern Sierra Nevada; San Bernardino and San Jacinto Mountains. Breeds in small colonies on cliffs behind or adjacent to waterfalls in deep canyons and sea-bluffs above the surf; forages widely.	May occur, but the potential is low for nesting and foraging. Limited nesting habitat in the Project Vicinity. Not observed during general biological surveys in 2023.
Dendragapus fuliginosus howardi Mount Pinos sooty grouse	–	CDFW _SSC	An inhabitant of southern Sierra Nevada Mountains, in small islands of populations. Mainly inhabits white fir covered slopes. Also found in other conifer types and open, brushy areas adjacent to forest.	May occur, but the potential is low for nesting and foraging. Limited nesting habitat in the Project Vicinity. Not observed during general biological surveys in 2023.

Scientific/ Common Name	Federal Status	State Status	Habitat	Likelihood for Occurrence/ Occurrence Notes
Empidonax traillii extimus southwestern willow flycatcher	USFWS_FE	CDFW_SE	Found in riparian woodlands in southern California. Willow-dominated riparian habitats that are similar to least Bell's vireo nesting habitats; shows a stronger preference for sites with surface water in the vicinity, such as along streams, on the margins of a pond or lake, and at wet mountain meadows.	May occur, but the potential is low nesting and foraging. Limited suitable riparian habitat in Project Vicinity. However, this species has been known to nest in areas where there is suitable riparian habitat around Lake Isabella, the Kern River Preserve, and the South Fork Wildlife Area. Not observed during riparian bird surveys in 2023. Project is outside designated critical habitat.
Gymnogyps californianus California Condor	USFWS_FE	CDFW_SE	This species requires vast expanses of open savannah, grasslands, and foothill chaparral with cliffs, large trees and snags for roosting. Condors nest in caves, crevices, hollow trees, and large ledges on high sandstone cliffs. The condor is somewhat unpredictable because the behavior of reintroduced birds is not always predictable.	May occur, but the potential is low for nesting and low for foraging. The Project contains suitable foraging habitat to support the California condor. Not observed during general biological surveys in 2023. Project is outside designated critical habitat.
Icteria virens yellow-breasted chat	–	CDFW _SSC	A summer resident; inhabits riparian thickets of willow and other brushy tangles near watercourses. Nests in low, dense riparian, consisting of willow, blackberry, wild grape; forages and nests within 10 feet of ground.	May occur. Low potential for nesting and foraging due to limited suitable riparian habitat in Project Vicinity. However, this species has been observed south of the Project just north of Lake Isabella. Not observed during riparian bird surveys in 2023.

Scientific/ Common Name	Federal Status	State Status	Habitat	Likelihood for Occurrence/ Occurrence Notes
Setophaga petechia yellow warbler	USFWS_BCC	CDFW _SSC	Found in riparian plant associations in close proximity to water. Also nests in montane shrubbery in open conifer forests in the Cascades and Sierra Nevada. Frequently found nesting and foraging in willow shrubs and thickets, and in other riparian plants including cottonwoods, sycamores, ash, and alders.	**Present.** Species was observed along Salmon Creek, Corral Creek, Cannel Creek, and various locations along the Kern River.
Vireo bellii pusillus least Bell's vireo	USFWS_FE	CDFW_SE	A summer resident of southern California in low riparian in vicinity of water or in dry river bottoms; below 2,000 feet. Nests placed along margins of bushes or on twigs projecting into pathways, usually willow, Baccharis, and mesquite.	May occur, but the potential is low for nesting and foraging. Limited suitable riparian habitat in the Project Vicinity. However, this species has been observed around Lake Isabella, the Kern River Preserve, and the South Fork Wildlife Area. Not observed during riparian bird surveys in 2023. Project is outside designated critical habitat.
Mammals				
Antrozous pallidus pallid bat	USFS_S BLM_S	CDFW _SSC	Found in deserts, grasslands, shrublands, woodlands, and forests. Most common in open, dry habitats with rocky areas for roosting. Roosts must protect bats from high temperatures. Very sensitive to disturbance of roosting sites.	May occur, but the potential is low for roosting and moderate for foraging. This species has been documented to occur south of the Project at Lake Isabella. Not observed during general biological surveys in 2023.

Scientific/ Common Name	Federal Status	State Status	Habitat	Likelihood for Occurrence/ Occurrence Notes
Aplodontia rufa californica Sierra Nevada mountain beaver	–	CDFW _SSC	Found in the dense growth of small deciduous trees and shrubs, wet soil, and abundance of forbs in the Sierra Nevada and east slope. Needs dense understory for food and cover. Burrows into soft soil. Needs abundant supply of water.	May occur. Moderate potential due to marginally suitable habitat in Project Vicinity. However, suitable wet forest habitat occurs along stream adjacent to the Project Vicinity. There are multiple documented occurrences along the Kern River. Not observed during general biological surveys in 2023.
Corynorhinus townsendii Townsend's big-eared bat	USFS_S BLM_S	CDFW _SSC	Found throughout California in a wide variety of habitats. Most common in mesic sites. Roosts in the open, hanging from walls and ceilings. Roosting sites limiting. Extremely sensitive to human disturbance.	May occur but the potential is low for roosting and high for foraging. This species has been documented to occur south of the Project near Lake Isabella. Not observed during general biological surveys in 2023.
Eumops perotis western bonneted bat (western mastiff bat)	BLM_S	CDFW _SSC	Found in many open, semi-arid to arid habitats, including conifer and deciduous woodlands, coastal scrub, annual and perennial grasslands, palm oases, chaparral, desert scrub, and urban. Crevices in cliff faces, high buildings, trees, and tunnels are required for roosting.	May occur but the potential is low for roosting and high for foraging. This species has been documented to occur south of the Project near Lake Isabella. Not observed during general biological surveys in 2023.
Gulo gulo California wolverine	Proposed Threatened USFS_S	CDFW_ST CDFW _FP	Found in the north coast mountains and the Sierra Nevada. Found in a wide variety of high elevation habitats. Needs water source. Uses caves, logs, burrows for cover and den area. Hunts in more open areas. Can travel long distances.	No potential to occur. Extirpated from this part of California. Not observed during general biological surveys in 2023.

Scientific/ Common Name	Federal Status	State Status	Habitat	Likelihood for Occurrence/ Occurrence Notes
Martes caurina sierrae Sierra marten	USFS_S	–	Found in mixed evergreen forests with more than 40% crown closure along Sierra Nevada and Cascade mountains. Needs a variety of different-aged stands, particularly old-growth conifers and snags which provide cavities for dens/nests.	May occur, but the potential is low for denning but moderate for foraging. There is no suitable denning habitat within the Project Vicinity. The Project is below the known and elevation range of the species. Not observed during general biological surveys in 2023.
Onychomys torridus tularensis Tulare grasshopper mouse	BLM_S	CDFW _SSC	Found in hot, arid valleys and scrub deserts in the southern San Joaquin Valley. Diet almost exclusively composed of arthropods, therefore needs abundant supply of insects.	No potential to occur. There is no suitable habitat within the Project Vicinity and the Project is outside the known historic and elevation range. Not observed during general biological surveys in 2023.
Pekania pennanti Pacific fisher – West Coast DPS	USFS_S BLM_S	CDFW_ST CDFW _SSC	Found in the intermediate to large-tree stages of coniferous forests and deciduous-riparian areas with high percent canopy closure. Uses cavities, snags, logs, and rocky areas for cover and denning. Needs large areas of mature, dense forest.	No potential to occur. Suitable dense forest and canopy cover is not present in Project Vicinity. Not observed during general biological surveys in 2023.
Taxidea taxus American badger	–	CDFW _SSC	Most abundant in drier open stages of most shrub, forest, and herbaceous habitats, with friable soils. Needs sufficient food, friable soils, and open, uncultivated ground. Preys on burrowing rodents. Digs burrows.	May occur, but the potential is low. No known records of occurrence in the Project Vicinity. However, there is suitable habitat in the Project Vicinity. Not observed during general biological surveys in 2023.

Scientific/ Common Name	Federal Status	State Status	Habitat	Likelihood for Occurrence/ Occurrence Notes
Vulpes vulpes necator Sierra Nevada red fox	Candidate USFS_S	CDFW_ST	Historically found from the Cascades down to the Sierra Nevada. Found in a variety of habitats from wet meadows to forested areas. Use dense vegetation and rocky areas for cover and den sites. Prefer forests interspersed with meadows or alpine fell-fields.	May occur, but the potential is low. Suitable habitat is not present within the Project Vicinity and known populations occur at higher elevations further north. Not observed during general biological surveys in 2023.

BLM: Bureau of Land Management; CDFW = California Department of Fish and Wildlife; DPS = Distinct Population Segment; NFKR = North Fork Kern River; USFS = U.S. Forest Service

Notes:

USFWS
FE = Endangered
FT = Threatened
FCT = Federal Candidate Threatened
BCC = Birds of Conservation Concern

USFS
S = Sensitive

BLM
S = Sensitive

CDFW
SE = Endangered
ST = Threatened
FP = Fully Protected
SSC = Species of Special Concern

Table 5.2-3. U.S. Fish and Wildlife Service Bird Species of Conservation Concern

Species	Common Name	Occurrence Notes
Cypseloides niger	Black Swift	Not observed during general biological surveys.
Spizella atrogularis	Black-chinned Sparrow	Not observed during general biological surveys.
Strix occidentalis occidentalis	California Spotted Owl	Not observed during general biological surveys.
Toxostoma redivivum	California Thrasher	**Observed** throughout the study area during general biological surveys.
Carpodacus cassinii	Cassin's Finch	Not observed during general biological surveys.
Aechmophorus clarkii	Clark's Grebe	Not observed during general biological surveys.
Geothlypis trichas sinuosa	Common Yellowthroat	Not observed during general biological surveys.
Calypte costae	Costa's Hummingbird	Not observed during general biological surveys.
Aquila chrysaetos	Golden Eagle	**Observed** just south of Cannel Creek during habitat assessment and general biological surveys. One individual was observed flying over the study area.
Carduelis lawrencei	Lawrence's Goldfinch	**Observed** along the Kern River during riparian bird surveys.
Melanerpes lewis	Lewis's Woodpecker	Not observed during general biological surveys.
Picoides nuttallii	Nuttall's Woodpecker	**Observed** along Corral Creek during habitat assessment and riparian bird surveys.
Baeolophus inornatus	Oak Titmouse	**Observed** during habitat assessment and riparian bird surveys.
Contopus cooperi	Olive-sided Flycatcher	Not observed during general biological surveys.
Selasphorus rufus	Rufous Hummingbird	**Observed** throughout the study area during general biological surveys.
Melospiza melodia	Song Sparrow	**Observed** along Salmon Creek, Corral Creek, Cannel Creek, and the Kern River during habitat assessment and riparian bird surveys.
Pipilo maculatus clementae	Spotted Towhee	**Observed** throughout the study area during habitat assessment and general biological surveys.
Agelaius tricolor	Tricolored Blackbird	Not observed during general biological surveys.
Numenius phaeopus	Whimbrel	Not observed during general biological surveys.
Picoides albolarvatus	White Headed Woodpecker	Not observed during general biological surveys.

Species	Common Name	Occurrence Notes
Sphyrapicus thyroideus	Williamson's Sapsucker	Not observed during general biological surveys.
Empidonax traillii	Willow Flycatcher	Not observed during general biological surveys.
Chamaea fasciata	Wrentit	Not observed during general biological surveys.

One additional species of interest, the American dipper, was observed at two locations in the study area during the riparian bird surveys. The first location was along the Kern River, just upstream of the Fairview Dam, and the second location was along Salmon Creek near Adit 8B/9A. Both locations consisted of pairs that were presumably nesting in the immediate vicinities.

6.0 STUDY SPECIFIC CONSULTATION

USFWS was consulted regarding the request to use playback vocalizations for the least Bell's vireo. The USFWS does not issue permits for individuals to use playback of least Bell's vireo outside of conducting research and/or pulling the species into mist nets for banding (personal communication, Stacey Love, Recovery Permit Coordinator, USFWS, February 13, 2023). Therefore, recorded least Bell's vireo vocalizations were not used during the riparian bird surveys.

7.0 OUTSTANDING STUDY PLAN ELEMENTS

All study plan elements have been completed as outlined in SCE's RSP (SCE, 2022) filing and FERC's SPD (FERC, 2022) with the exception of the variances described above.

8.0 REFERENCES

Allen, L.W., and K.L. Garrett. 1996. *Atlas Handbook: Los Angeles County Breeding Bird Atlas*. West Hollywood CA: Los Angeles Audubon Society.

American Ornithologists' Union. 1998. *Check-list of North American Birds* (7th ed). Shipman, VA: Buteo Books. [Hardcover version, compendium cites most recent supplement; use AOU 20[xx] in methods section. Use this and any applicable supplements for distribution info.]

Bent, A.C. 1940. "Life histories of North American cuckoos, goatsuckers, hummingbirds, and their allies. Orders Psittaciformes, Cuculiformes, Trogoniformes, Coraciiformes, Caprimulgiformes, and Micropodiiformes." *Bulletin of the United States National Museum,* i–viii, 1-506, 73 pls. Accessed: October 2023. Retrieved from: https://doi.org/10.5479/si.03629236.176.i

Blood, B.R. 2023. *Terrestrial Mammals of Southern California and the Eastern and Southern Sierra Nevada*. In Press.

Bloom (Bloom Biological, Inc.). 2009. *Environmental Assessment of the Centennial Specific Plan Project Site on the California Condor (Gymnogyps californianus).* Santa Ana, California.

Brown, B.T. 1993. Bell's Vireo (*Vireo bellii*). *The Birds of North America, No. 35* (A. Poole, P. Stettenheim, and F. Gill, Eds.). Philadelphia, PA and Washington, D.C.: The Academy of Natural Sciences and the AOU (respectively).

Carstensen, D., D. Ahlers, and D. Moore. 2015. *Yellow-billed Cuckoo Study Results – 2014: Middle Rio Grande from Los Lunas to Elephant Butte Reservoir, New Mexico*. U.S. Bureau of Reclamation, Technical service Center, Denver, CO.

CDFW (California Department of Fish and Wildlife). 2015. *Special Animals List.* Natural Heritage Division, California Department of Fish and Game, Sacramento, California.

_____. 2022. California Natural Diversity Database. RareFind5 [Internet]. Version 5.1.1. Electronic database. Records of Occurrence for: Johnsondale, Fairview, Kernville, Tobias Peak, Cannell Peak, Alta Sierra, and Lake Isabella. Natural Heritage Division, California Department of Fish and Game, Sacramento, California.

_____. 2023 (January). *Special Animals.* Sacramento, CA: CDFW, Natural Heritage Division.

Chapin, E. 1925. "Food habits of the vireos; a family of insectivorous birds." *Bulletin,*1355: 1–44. Washington, D.C.: United States Department of Agriculture.

Coues, E. 1903. *Key to North American birds* (5th ed.). Boston, MA: The Page Co.

Corben, C. 2001. *Report on a Survey for Western Red Bats* Lasiurus blossevillii *on National Forests in California*.

eBird. 2020. *View and Explore: Species Maps*. http://ebird.org/ebird/map/.

Ehrlich, P.R., D.S. Dobkin, and D. Wheye. 1992. *Birds in Jeopardy*. Stanford, CA: Stanford University Press.

Faber, P., E. Keller, A. Sands, B. Massey. 1989. *The Ecology of Riparian Habitats of the Southern California Coastal Region: A Community Profile* (Biological Report 85 [7.27]). Washington, D.C: U.S. Fish and Wildlife Service, Research and Development, National Wetlands Research Center.

Farney, J. and E.D. Fleharty. 1969. "Aspect ratio, loading, wingspan, and membrane areas of bats." *J. Mammal,* 50:362–367.

FERC (Federal Energy Regulatory Commission). 2022. *Study Plan Determination for the Kern River No. 3 Hydroelectric Project*. Accession No. 20221012-3024. October 12.

Findley, J.S., E.H. Studier, and D.E. Wilson. 1972. "Morphologic properties of bat wings." *J. Mammal*. 53:429–444.

Franzreb, K.E. 1989. *Ecology and Conservation of the Endangered Least Bell's Vireo* (Biological Report 89[1]). Washington, D.C.: USFWS, Endangered Species Office.

Garrett, K. and J. Dunn. 1981. *Birds of Southern California: Status and Distribution*. Los Angeles, CA: Audubon Press.

Goldwasser, S. 1981. *Habitat Requirements of the Least Bell's Vireo* (Final Report, Job IV-38.1). Sacramento, CA: CDFG.

Gray, V. And J. Greaves. 1981. *The Riparian Forest as Habitat for the Least Bell's Vireo* (Vireo bellii pusillus). Paper presented at the California Riparian Systems Conference, University of California, Davis.

Greco, S.E. 2008. "Long-term Conservation of the Yellow-billed Cuckoo Will Require Process-based Restoration on the Sacramento River." *Ecesis* ,18(3): 4–7.

Grinnell, J. and A.H. Miller.1944. *The Distribution of the Birds of California* (reprint from Cooper Ornithological Club's December 30, 1944, Pacific Coast Avifauna No. 27). Lee Vining, CA: Artemesia Press. Reprinted in April 1986.

Grover, M.C. 2006. "Comparative effectiveness of nighttime visual encounter surveys and cover object searches in detecting salamanders." *Herpetological Conservation and Biology*, 1: 93–99.

Halterman, M., M.J. Johnson, J.A. Holmes, and S.A. Laymon. 2001. *Status of the Yellow-billed Cuckoo in California: 1999–2000*. Dixon, CA: U.S. Geological Survey.

_____. 2015*. A Natural History Summary and Survey Protocol for the Western Distinct Population Segment of the Yellow-billed Cuckoo: U.S. Fish and Wildlife Techniques and Methods*.

Halterman, M.D. 2009. 1991. "Distribution and Habitat use of the Yellow-billed Cuckoo (*Coccyzus americanus occidentalis*) on the Sacramento River, California, 1987-1990." Master's Thesis. Chico, CA: California State University.

———. 2002. Surveys and Life History Studies of the Yellow-Billed Cuckoo: Summer 2001. Admin. Rept., Bureau of Reclamation, Lower Colorado Regional Office, Boulder City, NV and Bureau of Land Management. Sierra Vista, AZ.: Bureau of Reclamation and BLM.

_____. Sexual dimorphism, detection probability, home range, and parental care in the yellow-billed cuckoo. Dissertation. Reno, NV: University of Nevada, Reno, USA.

Hamilton, R.A., and D.R. Willick. 1996. T*he Birds of Orange County, California: Status and Distribution.* Irvine, CA: Sea and Sage Audubon Society.

Hughes, J.M. 1999. Yellow-billed Cuckoo (*Coccyzus americanus*). *The Birds of North America, No. 418* (A. Poole and F. Gill, Eds.). Philadelphia, PA: The Academy of Natural Sciences.

Johnson, M.J., S.L. Durst, C.M. Calvo, L. Stewart, M.K. Sogge, G. Bland, and T. Arundel. 2008. *Yellow-billed cuckoo distribution, abundance, and habitat use along the lower Colorado River and its tributaries, 2007 Annual Report*. U.S. Geological Survey Open-File Report 2008–1177.

Johnson, M.J., S.L. Durst, C.M. Calvo, L. Stewart, M.K. Sogge, G. Bland, and T. Arundel. 2010. “Kern River in California.” Master’s Thesis. Calif, State Univ. Bakersfield.

Kus, B.E., and K.L. Miner. 1987. *Foraging behavior of the least Bell’s vireo: use of riparian and non-riparian habitats.* San Diego State University, San Diego, CA. 22 pp. Unpubl. Rep.

Lehman, P.E. 2022. *The Birds of Santa Barbara County, California*, (revised edition, May 2022). Accessed: September 2023. Retrieved from: http://www.sbcobirding.com/lehmanbosbc.html.

Lawlor. 1973. “Aerodynamic characteristics of some neotropical bats.” *J. Mammal.* 54:71-78.

Laymon, S.A. 1998. *Yellow-billed Cuckoo survey and monitoring protocol for California*. Available from the author, P. O. Box 1236, Weldon, California, 93282.

Laymon, S.A. and M.D. Halterman. 1987. *Distribution and status of the yellow-billed cuckoo in California: 1986-1987*. Final Report to the California Department of Fish and Game, Nongame Bird and Mammal Section, Wildlife Management Division. Sacramento, CA: CDFG.

_____. 1989. A Proposed Habitat Management Plan for Yellow-Billed Cuckoos in California *Proceedings of the California Riparian Systems Conference: protection, management, and restoration for the 1990s* (September 22–24, 1988) (USDA Forest Service General Technical Report PSW-110 p 272–277). Berkeley, CA: USDA Forest Service, Pacific Southwest Forest and Range Experiment Station.

Laymon, S.A., P.L. Williams, and M.D. Halterman. 1997. B*reeding Status of the Yellow-billed Cuckoo in the South Fork Kern River Valley, Kern County, California: Summary Report 1985–1996*. Prepared for the U.S. Department of Agriculture Forest Service, Sequoia National Forest, Cannell Meadow Ranger District.

Long, M.C.1993, *Birds of the Whittier Narrows Recreation Area; Los Angeles County, California*. South El Monte, CA: Whittier Narrows Nature Center Associates.

McCaskie, G. and K.L. Garrett. 2013. "The Nesting Season: June through July 2012." *North American Birds*, 66(4): 732–736.

_____.2014. "The Nesting Season: June through July 2013." *North American Birds,* 67(4): 649–652.

_____.2015. "The Nesting Season: June through July 2014." *North American Birds* 68(4): 552–556.

_____. 2016. "The Nesting Season: June through July 2015." *North American Birds*, 69(4): 489–496.

McNeil, S.E., D. Tracy, J.R. Stanek, and J.E. Stanek. 2013. *Yellow-billed Cuckoo Distribution, Abundance and Habitat Use on the Lower Colorado River and Tributaries, 2008–2012 Summary Report.* Submitted to the Bureau of Reclamation, Lower Colorado River Multi-Species Conservation Program, Boulder City, Nevada, by the Southern Sierra Research Station. www.lcrmscp.gov/reports/2012/d7_sumrep_08-12.pdf.

Meretsky, V.J. and N.F.R. Snyder. 1992. "Range Use and Movements of California Condors." *The Condor* 94: 313–335. Los Angeles, CA: Cooper Ornithological Society.

Miner, K.L. 1989. "Foraging Ecology of the Least Bell's Vireo, *Vireo bellii pusillus"* (Unpublished Master's Thesis). San Diego, CA: California State University, San Diego.

Noel, E. 2021. *Seasonal Composition of Bats in Upper and Lower Elevations along the Kern River in California*. A Thesis Submitted to The Department of Biology, California State University, Bakersfield.

Norberg, U. 1994. "Wing Design, Flight Performance, and Habitat Use in Bats." In *Ecological Morphology* (Wainwright, P.C. and S.M. Reilly). University of Chicago Press.

Noss, R.F., E.T. LaRoe III, and J.M. Scott. 1995. *Endangered Ecosystems of the United States: A Preliminary Assessment of Loss and Degradation*. U.S. Geological Survey, Biological Resources Division (National Biological Service), BSR no. 9501. Washington, DC.: USGS.

Ohmart. 1994. “The Effects of Human-Induced Changes on the Avifauna of Western Riparian Habitats.” *Studies in Avian Biology* 15:273–285.

Psomas. 2013a. *Southwestern Pond Turtle Observations during Pre-construction Surveys in Support of the KR3 Flowline Roads Improvement Project*.

_____. 2013b. *Biological Resources Technical Report for the Kern River 3 Sandbox Repair Project.*

RECON (Regional Environmental Consultants). 1988. *Draft Comprehensive Species Management Plan for the Least Bell’s Vireo.* (Prepared for the San Diego Association of Governments). San Diego, CA: RECON.

———. 1989. *Comprehensive Species Management Plan for the Least Bell’s Vireo* (Vireo bellii pusillus). Prepared for San Diego Association of Governments, San Diego.

_____. Salata, L.R. 1981. Least Bell’s vireo research, Camp Pendleton Marine Corps Base, San Diego County, California, 1981. Unpublished Report, Natural Resources Officer, Camp Pendleton.

1983. *Status of the Least Bell’s Vireo on Camp Pendleton, California: Report on Research Done in 1983*. Laguna Niguel, CA: USFWS.

SCE (Southern California Edison). 2021. *Kern River No. 3 Hydroelectric Project (FERC Project No. 2290) Pre-Application Document.* Accessed: July 2023. Retrieved from https://www.sce.com/sites/default/files/inline-files/KR3_PAD_Volume_I_Public.pdf

_____. 2022. *Kern River No. 3 Hydroelectric Project, Revised Study Plan*. Filed with FERC on July 1. Accessed: August 2023. Retrieved from: sce.com/sites/default/files/custom-files/Webfiles/Revised_Study_Plan_KR3_20220701.pdf

Sedgwick, J.A. 2000. Willow Flycatcher (*Empidonax traillii*). *The Birds of North America, No. 533* (A. Poole and F. Gill, Eds.). Philadelphia, PA: The Academy of Natural Sciences.

Sogge, M.K., Ahlers, Darrell, and Sferra, S.J. 2010. “A natural history summary and survey protocol for the southwestern willow flycatcher.” *U.S. Geological Survey Techniques and Methods 2A-10*, 38 p.

Spencer, W.D., S.C. Sawyer, H.L. Romsos, W.J. Zielinski, C.M. Thompson, and S.A. Britting. 2016. *Southern Sierra Nevada fisher conservation strategy*. Version 1.0. Unpublished report produced by Conservation Biology Institute.

Stanek, J. R., and J. E. Stanek. 2012. *Yellow-billed Cuckoo Occupancy, Breeding, and Habitat Use in the South Fork Kern River Valley, 2012 Annual Report*. Report to the U.S. Fish and Wildlife Service, Sacramento Office. Sacramento, CA: USFWS.

Strain, G., R. Raesly, and R.H. Hilderbrand. 2009. "A comparison of techniques to sample salamander assemblages along highland streams of Maryland." *Environmental Monitoring and Assessment*, 156: 1-16. DOI 10.1007/s10661-008-0459-3

Struthsaker, T. T. 1961. "Morphological factors regulating flight in bats." *J. Mammal,* 42: 152–159.

Unitt, P. 1984. *The Birds of San Diego County* (Memoir 13). San Diego, CA: San Diego Society of Natural History.

_____. 1987. "*Empidonax traillii extimus:* An Endangered Subspecies." *Western Birds*. 18(3): 137–162. San Diego, CA: Western Field Ornithologists.

_____. 2004. "San Diego County Bird Atlas." *San Diego Society of Natural History*, No. 39. San Diego, CA: Ibis Publishing Co.

USDOI (U.S. Department of Interior). 1994. T*he Impact of Federal Programs on Wetlands, Vol. II, A Report to Congress by the Secretary of the Interior*. Washington, DC. March.

USFWS (U.S. Fish and Wildlife Service). 1998. *Draft Recovery Plan for the least bell's vireo.* U. S. Fish and Wildlife Service, Portland, Or.

_____. 2002. *Southwestern Willow Flycatcher Recovery Plan*. Albuquerque, New Mexico. i-ix + 210 pp., Appendices A-O

———. 2013. Proposed Threatened Status for the Western Distinct Population Segment of the Yellow-billed Cuckoo (*Coccyzus americanus*). Proposed Rule. *Federal Register* 78(192): 61622-61666. Washington, D.C.: USFWS.

_____. 2014a. Endangered and Threatened Wildlife and Plants; Determination of Threatened Status for the Western Distinct Population Segment of the Yellow-billed Cuckoo (Coccyzus americanus); Final Rule. *Federal Register* 79(192): 59992-60038. Washington, D.C.; USFWS.

———. 2014b. Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Western Distinct Population Segment of the Yellow-Billed Cuckoo (Coccyzus americanus); Proposed Rule. *Federal Register* 79(158):48548 – 48652. Washington, D.C.; USFWS.

———. 2014c. Designation of Critical Habitat for the Western Distinct Population Segment of the Yellow-Billed Cuckoo; Proposed Rule. *Federal Register* 79(158): 48548-48652. Washington, D.C.: USFWS.

_____. 2017. 12-Month Findings on Petitions To List a Species and Remove a Species From the Federal Lists of Endangered and Threatened Wildlife and Plants; Notice of 12-month Petition Findings (Beaverpond Marstonia and Southwestern Willow Flycatcher).

_____. 2022. Species Status Assessment for the Relictual Slender Salamander (*Batrachoseps relictus*), Kern Canyon Slender Salamander (*Batrachoseps simatus*), and Kern Plateau Salamander (*Batrachoseps robustus*). Sacramento Fish and Wildlife Office, Sacramento, California. 82 pp.

Vaughan, T. A. 1959. “Functional morphology of three bats: *Eumops*, *Myotis*, *Macrotus*.” *Univ. Kansa Publ*. Vol. 12, No. 1: 1–153.

_____. 1966. “Morphology and flight characteristics of Molossid bats.” *J. Mammal*, 47: 249–260.

Webster, R.E., P. Lehman, and L. Bevier. 1980. *The Birds of Santa Barbara and Ventura Counties* (Occasional Paper No. 10. Santa Barbara). Santa Barbara, CA: Santa Barbara Museum of Natural History.

Wheelock, I.G. 1912. *Birds of California: an introduction to more than three hundred common birds of the state and adjacent islands*. A.C. McClurg and Company, Chicago, Illinois.

Willett, G. 1912. Birds of the Pacific Slope of Southern California. *Pacific Coast Avifauna* No. 7. Cooper Ornithological Club.

Zielinski, W. J., J. A. Baldwin, R. L. Truex, J. M. Tucker, and P. A. Flebbe. 2013. “Estimating Trend in Occupancy for the Southern Sierra Fisher *Martes pennanti* Population.” *Journal of Fish and Wildlife Management*, 4(1): 3–19. doi: https://doi.org/10.3996/012012-JFWM-002

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APPENDIX A
SITE PHOTOGRAPHS

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APPENDIX B
WILDLIFE COMPENDIUM

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Wildlife Species Observed During Surveys

Scientific Name	Common Name	Special Status
LIZARDS		
PHRYNOSOMATIDAE – SPINY LIZARD FAMILY		
Sceloporus occidentalis	western fence lizard	
Uta stansburiana	common side-blotched lizard	
TEIIDAE – WHIPTAIL LIZARD FAMILY		
Aspidoscelis tigris munda	California whiptail	
BIRDS		
ODONTOPHORIDAE – NEW WORLD QUAIL FAMILY		
Callipepla californica	California quail	
COLUMBIDAE – PIGEON AND DOVE FAMILY		
Patagioenas fasciata	band-tailed pigeon	
*Streptopelia decaocto**	Eurasian collared-dove	
Zenaida macroura	mourning dove	
APODIDAE – SWIFT FAMILY		
Aeronautes saxatalis	white-throated swift	
TROCHILIDAE – HUMMINGBIRD FAMILY		
Selasphorus sasin	Allen’s hummingbird	
ARDEIDAE – HERON FAMILY		
Ardea alba	great egret	
CATHARTIDAE – NEW WORLD VULTURE FAMILY		
Cathartes aura	turkey vulture	
ACCIPITRIDAE – HAWK FAMILY		
Buteo lineatus	red-shouldered hawk	
Aquila chrysaetos	golden eagle	FP
PICIDAE – WOODPECKER FAMILY		
Sphyrapicus ruber	red-breasted sapsucker	
Picoides nuttallii	Nuttall’s woodpecker	
Picoides villosus	hairy woodpecker	
Colaptes auratus	northern flicker	
TYRANNIDAE – TYRANT FLYCATCHER FAMILY		
Contopus sordidulus	western wood-pewee	

Sayornis nigricans	black phoebe	
Myiarchus cinerascens	ash-throated flycatcher	
Tyrannus vociferans	Cassin's kingbird	
Tyrannus verticalis	western kingbird	
CORVIDAE – JAY AND CROW FAMILY		
Aphelocoma californica	California scrub-jay	
Corvus corax	common raven	
HIRUNDINIDAE – SWALLOW FAMILY		
Petrochelidon pyrrhonota	cliff swallow	
AEGITHALIDAE – BUSHTIT FAMILY		
Psaltriparus minimus	bushtit	
TROGLODYTIDAE – WREN FAMILY		
Troglodytes aedon	house wren	
CINCLIDAE – DIPPER FAMILY		
Cinclus mexicanus	American dipper	
TURDIDAE – THRUSH FAMILY		
Sialia mexicana	western bluebird	
MIMIDAE – MOCKINGBIRD AND THRASHER FAMILY		
Toxostoma redivivum	California thrasher	
PTILOGONATIDAE – SILKY-FLYCATCHER FAMILY		
Phainopepla nitens	phainopepla	
FRINGILLIDAE – FINCH FAMILY		
Haemorhous mexicanus	house finch	
Spinus lawrencei	Lawrence's goldfinch	
PASSERELLIDAE – NEW WORLD SPARROW FAMILY		
Melospiza melodia	song sparrow	
Melozone crissalis	California towhee	
Pipilo maculatus	spotted towhee	
ICTERIDAE – BLACKBIRDS AND ORIOLES		
Icterus cucullatus	hooded oriole	
Agelaius phoeniceus	red-winged blackbird	
PARULIDAE – WOOD-WARBLER FAMILY		
Geothlypis trichas	common yellowthroat	
Setophaga petechia	yellow warbler	SSC
Setophaga townsendi	Townsend's warbler	

CARDINALIDAE – CARDINALS AND ALLIES		
Piranga ludoviciana	western tanager	
Passerina caerulea	blue grosbeak	
Passerina amoena	lazuli bunting	
MAMMALS		
SCIURIDAE – SQUIRREL FAMILY		
Sciurus griseus	western gray squirrel	
Otospermophilus beecheyi	California ground squirrel	

USFWS: U.S. Fish and Wildlife Service; CDFW: California Department of Fish and Wildlife
Notes:
Species Status:
State (CDFW)
FP = Fully Protected
SSC = Species of Special Concern

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APPENDIX C
BAT NATURAL HISTORY SUMMARY

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Family Vespertilionidae

Hoary bat (*Aeorestes cinereus*): The hoary bat roosts in medium to large trees in areas with dense leaf coverage, generally 3 to 5 meters above the ground. It roosts solitarily, making it difficult to locate. Roosts can be in conifers, hardwoods, or even palm trees. It has been found in buildings and caves, but trees are preferred. Roost sites need to have open space below. It is found in wild areas and also in urban, suburban, and rural areas. The hoary bat is an insectivore, eating primarily on moths, but does take other insects as well. Its foraging flight is swift and straight and includes soaring and gliding. It forages in open areas and open forest edges, near the treetops, along streams, lake shores, and in urban areas where there are lots of trees. The hoary bat has long, narrow wings designed for fast (up to 20 kilometers per hour), less maneuverable flight, so it prefers open uncluttered habitats for foraging.

Pallid bat (*Antrozous pallidus*): The pallid bat is found in a wide variety of habitats, including grasslands, farmland, shrublands, woodlands, deserts, and conifer forests. Rocky outcrops are its preferred roost site, but it will also roost in caves, rock crevices, mines, hollow trees, and buildings. It uses separate day and night roosts. Roosts are often located near water, but nearby water is not a requirement for the siting of a roost. Night roosts may be located in more open sites, such as porches and open buildings. It is known to roost with a number of other bats, principally various species of Myotis and the Brazilian free-tailed bat. The pallid bat is a social species and colonies can number over 100. The pallid bat is an insectivore, eating a wide variety of large flying and ground-dwelling insects and arachnids, including beetles, orthopterans, homopterans, moths, spiders, scorpions, solpugids, and Jerusalem crickets. Also, it is known to occasionally take small lizards and small mice. Its foraging flight is unique among North American bats, being slow and maneuverable, but characterized by dips, swoops, and short glides. Besides capturing aerial prey, it also gleans prey off the ground. It forages close to the ground, usually at a height of between 0.5 and 2.5 meters. It is also able to forage for aerial insects among leaves and flowers of shrubs and trees.

Townsend's big-eared bat (*Corynorhinus townsendii*): Townsend's big-eared bat is found in a wide range of habitats from desert scrub to coastal scrub lands to montane forests with pine, fir, and aspen trees and is bound by shrub and grasslands, with a preference for mesic habitats. Its roosts are located in caves, cliff faces, rocky ledges, mines, tunnels, buildings, or other human-made structures. Townsend's big-eared bat is easily disturbed in the roost and will abandon a roost when disturbed by humans. Townsend's big-eared bat is an insectivore, eating primarily moths, but also beetles and other soft-bodied insects. It is a slow, maneuverable flyer and gleans insects from branches and foliage and also captures prey in flight. It is also able to hover. Foraging sites are usually near dense foliage, among tree branches, or along the edges of forested areas.

Big brown bat (*Eptesicus fuscus*): The big brown bat is found in nearly all habitats and plant communities. Prior to human presence and human-made structures and in nature, the big brown bat is found roosting in hollow trees, caves, or openings in rock ledges. It

uses buildings and other human-made structures for roosting, including residences, barns, silos, churches, storm sewers, and expansion joint spaces in concrete structures.

The big brown bat prefers to forage over open areas, water sources, or among trees in fairly open stands. It is an insectivore, eating a variety of flying insects, particularly large, hard-shelled scarab beetles and other beetles, but it will also eat dipterans, hymenopterans, and other insects. It usually forages above open habitats among scattered trees at an elevation of about 6 to 9 meters above the ground, though it will forage as close as 1 meter over the ground. The big brown bat's foraging flight is slow and steady.

Spotted bat (*Euderma maculatum*): The spotted bat is found in a variety of habitats, including deserts, grasslands, woodlands, Ponderosa pine, and mixed conifer forests. Within these habitats, its occurrence is patchy and depends on suitable roost habitat, of which, rock crevices on cliff faces are preferred, although it is known to roost in caves and in buildings. Usually found only as single individuals, the spotted bat is thought to be solitary and maintains a sizable distance between individuals but communicates with neighbors via vocalizations that are audible by humans.

The spotted bat is an insectivore, eating primarily moths (most likely Noctuid moths), but it may also take some beetles. It forages alone and may keep an exclusive foraging territory. It forages close to the ground, between 5 and 15 meters of the surface. The foraging flight is slow and elliptical, and its foraging path is about 200 to 300 meters in width. Its usual foraging sites are over water and adjacent open spaces. The spotted bat forages close to its day roost, normally within 10 kilometers. No night roosts are used; it forages continuously throughout the night.

Western red bat (*Lasiurus frantzii*): The western red bat is found along the coast, grasslands, shrublands, open woodlands, and mixed conifer woodlands. The western red bat is a treeroosting bat, and its roosts are located in the foliage of trees and shrubs in woodland and forests as well as wooded urban and suburban areas. Roosts are usually sited approximately 1.5 to 12.0 meters above the ground. Its preferred roost sites are dark and sheltered with clear air below the roost. Roost sites are often located in edge habitats adjacent to streams, fields, or urban and suburban areas. Riparian habitats are also used, and it is known to roost in mature stands of cottonwood, sycamore, and willows adjacent to streams. The western red bat has a summer and a winter range and migrates between the two. It most likely undertakes migration during the spring (i.e., March to May) and autumn (i.e., September to October). However, some western red bats have been known to hibernate in leaf litter throughout the winter instead of migrating.

It feeds over a wide variety of habitats, including grasslands, shrublands, open woodlands and forests, and croplands. The western red bat is an insectivore, eating primarily moths, crickets, beetles, and cicadas. It typically forages over habitat edges and open areas but has been observed foraging in urban, suburban, and rural environments. It forages from above the tree canopy to just above the ground. The western red bat's foraging flight is slow, erratic, and maneuverable.

California myotis (*Myotis californicus*): The California myotis can be found in coastal plains to desert, chaparral, woodlands, and mixed and coniferous forests. It roosts in crevices, buildings, under loose bark on trees (Ponderosa pine is a favorite), caves, and mines. Night roosts are usually open places, especially in human-made structures. The California myotis does not continuously use the same roost site but uses other available nearby roost sites.

The California myotis is an insectivore, eating a wide variety of flying insects and other arthropods, including moths, midge, flies, other dipterans, beetles, and spiders. It forages in areas with rock-walled canyons with open water, open woodlands and forests, or brushy habitats. Foraging flights are low over the ground or water, and among shrubs and trees, generally below 4 meters. The California myotis' foraging flight is slow and highly maneuverable, so it is able to quickly respond to patches of prey when located. It is able to detect prey at short distances and can make sharp turns to make repeated passes through "clouds of prey."

Western small-footed myotis (*Myotis ciliolabrum*): The western small-footed myotis is found in a wide variety of habitats, including relatively arid wooded and brushy uplands near water, semi-arid habitats, riparian areas near open grasslands, Great Basin scrub and pinyon-juniper forests, and coniferous forests. It is associated with open stands in forests and woodlands as well as brushy habitats. It roosts in caves, buildings, mines, crevices, and sometimes under bridges and under loose bark. It has been documented roosting in abandoned swallow nests. It often uses human-made structures as night roosts.

The western small-footed myotis is an insectivore, eating a variety of small, flying insects including moths, flies, beetles, and true bugs. Its foraging flight is slow and maneuverable. The small-footed myotis is often seen foraging among trees and over water. Its foraging flight pattern is in irregular circles from 1 meter above the ground to the tops of trees. When the western small-footed myotis and the California myotis co-occur, the western small-footed myotis forages along rock bluffs and the California myotis forages over water.

Long-eared myotis (*Myotis evotis*): The long-eared myotis is found in a variety of habitats, including bush lands, woodlands, and mixed coniferous forests from the coast to the higher elevation montane forests. In native forests, it roosts in tree cavities or large snags. Its preferred snags are high and reach above the surrounding canopy. Interestingly, in areas of clear-cut forests, it will roost in clear-cut stumps, especially Ponderosa pine and lodgepole pine. It will also use abandoned buildings, cracks in the ground, caves, mines, and spaces under loose bark on living and dead trees.

The long-eared myotis is an insectivore, eating a variety of arthropods, including beetles, moths, flies, and spiders. Its diet is heavy on beetles, and it may eat a higher percentage of beetles than any other species of Myotis. However, the literature also indicates that it feeds mainly on moths. Like other aerial insectivores, the long-eared myotis captures its prey in flight. The long-eared myotis, however, also gleans prey off the ground and off other surfaces. Its flight pattern is slow and maneuverable, and it is capable of hovering.

It forages along habitat edges, over open habitats, and over water. When foraging, it flies within 12 meters of the ground. It needs free water to drink and drinks while in flight.

Fringed myotis (*Myotis thysanodes*): The fringed myotis is found in a variety of habitats from desert scrub to pinyon-juniper, valley foothill hardwood, and hardwood-conifer forests at higher elevations. It roosts in caves, mines, tunnels, crevices, and old buildings. It has separate day and night roosts and is sensitive to human disturbance at roost sites.

The fringed myotis is an insectivore, primarily eating beetles, but also taking moths, arachnids, and orthopterans. Its foraging flight is slow and maneuverable and forages over water, near vegetation, and over open habitats, flying low over the canopy. Like many aerial insectivores, it captures its prey in its tail and wing membranes. Perhaps the fringe acts like a trap to help capture smaller insects. The fringed myotis can also hover and may prey on ground-dwelling prey items. Its ability to hover, along with slow, maneuverable flight allows the fringed myotis to glean prey on the surface of vegetation. This flight pattern is typical of bats with shorter, rounded wings with low aspect ratios.

Long-legged myotis (*Myotis volans*): The long-legged myotis is found in woodland and forest habitats, but can also be found foraging in chaparral, coastal scrub, and Great Basin shrub habitats. Roosts are located in hollow trees, in spaces under tree bark, in rock crevices, in fissures in stream banks, and on buildings. Caves and mines are used as night roosts. Trees are the most important day roosts.

The long-legged myotis is an insectivore, eating primarily moths, but also other flying insects such as termites, spiders, flies, beetles, leafhoppers, and lacewings. It can be found feeding alongside other bats, taking advantage of insect swarms. It forages a repeated circuit throughout the evening and will use the same circuit several nights in a row.

Yuma myotis (*Myotis yumanensis*): The Yuma myotis is found in a variety of habitats, including deserts, desert riparian, open woodlands and forests, juniper woodlands, and riparian habitats. Its roosts are located in caves, rock crevices, attics, buildings, mines, underneath bridges, and other similar structures. It also uses abandoned swallow nests. Its foraging flight is described as fluttery. It is surprisingly inconsistent and fluttering in its flight.

The Yuma myotis is an insectivore, eating a wide variety of insects, including moths, midges, flies, craneflies, beetles, termites, ants, homopterans, and caddisflies. An efficient forager, it can forage and return with a full stomach in 15 minutes. It has been reported that the Yuma myotis follows a regular foraging route and takes advantage of swarms of insects.

Canyon bat (*Parastrellus hesperus*): The canyon bat is found in a variety of habitats, including deserts, arid grasslands, brush and scrub lands, woodlands, and coniferous forests. It may be the most common bat in California's desert areas, especially those areas with rocky canyon walls and cliffs. It roosts in rock crevices, beneath rocks, in burrows (including kangaroo rat burrows), mines, and buildings. Roost sites are usually

located near a source of free water. It is also one of the earliest emerging bats, easily observed in the early evening just prior to sunset.

The canyon bat is an insectivore, eating a wide variety of flying insects, including moths, flies, true bugs, Hymenoptera, Hemipterans, and Coleoptera. It primarily eats soft-bodied prey, and usually only on one type of insect at a time, which means it seeks and forages through insect swarms. The canyon bat's foraging flight is slow and fluttery. It forages from between 2 to 15 meters above the ground. It often forages over water, in rocky canyons, over deserts, and along cliff faces.

Family Molossidae

Western bonneted bat (*Eumops perotis*): The western bonneted bat (also known as the western mastiff bat) is found in open, semi-arid to arid habitats, including conifer and deciduous woodlands, coastal scrub, annual and perennial grasslands, palm oases, chaparral, desert scrub, and urban habitats. Suitable roosting habitat consists of open areas with roost locations that have vertical faces that allow it to drop vertically to gain flight speed, such as crevices in rock outcroppings and cliff faces, tunnels, and tall buildings. The distribution of the western bonneted bat is likely limited by geomorphology because of its preference for crevices, caves, and tunnels with high vertical spaces. Rock crevices with horizontal entrances that face downward are preferred because it approaches and enters its roost from below. Natural roosts are often found under large exfoliating slabs of granite, sandstone slabs or in columnar basalt, on cliff faces or in large boulders, or man-made structures that mimic these features. In all cases, the vertical clearance needs to be at least 3.5 meters above the ground. Nursery roosts described as tight rock crevices are at least 90 centimeters deep and 5 centimeters wide or may be found in building crevices.

The western bonneted bat is an insectivore, eating relatively small, low-flying, and weak-flying insects, including moths, crickets, grasshoppers, bees, dragonflies, leaf bugs, beetles, true bugs, ants, and wasps. It also takes ground-dwelling insects, meaning that these prey items must be plucked from the ground or off the surface of vertical rock faces or other structures. It forages from ground level up to over 60 meters in elevation. Like other molossids, the western bonneted bat captures its prey on the wing. It rarely uses a night roost but rather forages continuously for 6 to 7 hours nightly. Foraging areas can range as far as 24 kilometers or more from its day roost site.

Brazilian free-tailed bat (*Tadarida brasiliensis*): The Brazilian free-tailed bat is found in a wide variety of habitats from mean sea level up through mixed conifer forests but prefers open habitats such as woodlands, shrublands, and grasslands. Roost sites include caves and man-made structures, such as bridges and attics. In nature, caves with large rooms and high ceilings are the best roosting sites for this species. It is also known to roost in hollow trees.

The Brazilian free-tailed bat is insectivorous, eating moths, beetles, dragonflies, flies, true bugs, wasps, bees, and ants. It forages high over surrounding habitats (30 meters or higher) and water sources. Its diet varies by prey availability. Insects are captured on the

wing. It may forage in the company of other bats, but it can usually be distinguished from these other species by its rapid, high flight.

