

Biological Resources Evaluation

Deer Creek DCID Dam Fish Passage Project

Tehama County, California
December 2018



Prepared for:

nhc

northwest hydraulic consultants

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Sacramento, CA 95816

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INTRODUCTION

Tehama Environmental Solutions, Inc. (TES) conducted this Biological Resources Evaluation (BRE) for Northwest Hydraulic Consultants (NHC) for the proposed Deer Creek DCID Dam Fish Passage Project (project). The purpose of this document is to identify and address potential impacts to special-status faunal species and rare natural communities that may be located within the proposed project site, or be affected by the proposed project. This BRE does not address potential impacts to botanical resources which were addressed in a separate report prepared by another firm (Dittes and Guardino Consulting 2018). Both of these reports will be used to form the basis for the National Environmental Policy Act (NEPA) / California Environmental Quality Act (CEQA) document.

Proposed Project

The purpose of the proposed project is to improve passage for adult and juvenile anadromous salmonids and other native species at the Deer Creek Irrigation District (DCID) diversion on Deer Creek, as identified in the Anadromous Fish Restoration Program and Ecosystem Restoration Program. In addition, the project intends to improve and maintain efficiency of the agricultural irrigation diversion.

The proposed project involves constructing a roughened channel (rock ramp) spanning the entire width of the creek downstream of the existing dam. In addition, the project will lower approximately 1,250 feet of the existing diversion ditch, and replace the off-channel fish screen and juvenile bypass pipe at a lower elevation. The project is being implemented by Trout Unlimited (TU) and the U.S. Fish and Wildlife Service (USFWS), in cooperation with the private landowners and the DCID Fish Passage Restoration Project Technical Team, which includes representatives from the USFWS, National Marine Fisheries Service (NMFS), California Department of Fish and Wildlife (CDFW), Central Valley Regional Water Quality Control Board (RWQCB), U.S. Army Corps of Engineers (Corps), DCID, and several private consulting firms.

Study Area Location

The study area for the project is located on Deer Creek, at approximately 11 river miles upstream of the confluence with the Sacramento River, east of Vina, Tehama County, California (Figure 1). Specifically, the study area is located in Sections 22, 23, and 27, Township 25 North, Range 1 West, Mount Diablo Base and Meridian, within the 7.5-minute United States Geological Survey (USGS) Acorn Hollow quadrangle map (Figure 2).

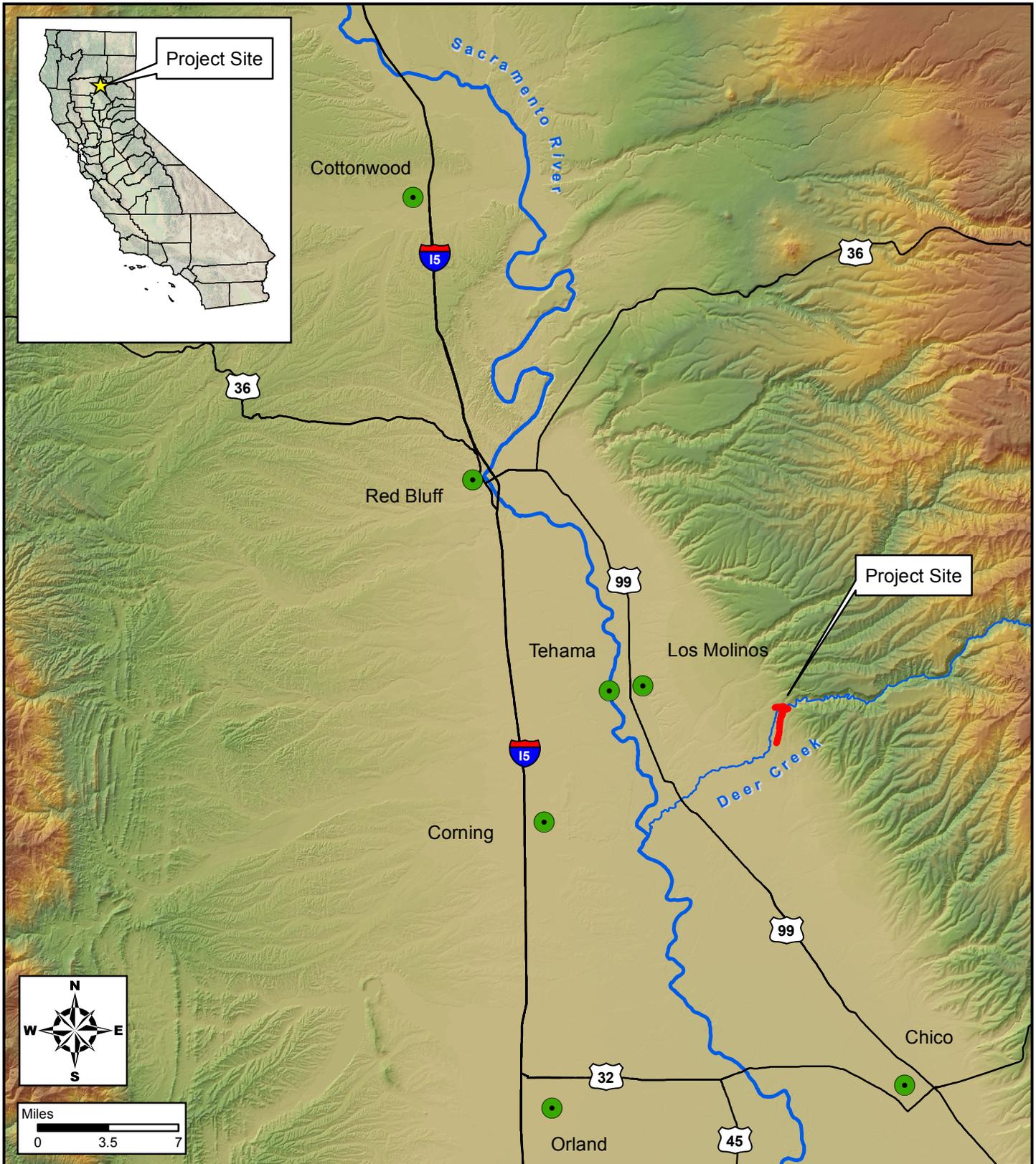
ENVIRONMENTAL SETTING

General Site Characteristics

The study area is located at the base of the foothills of the southernmost extent of the Cascade Range in Tehama County. The terrain is generally gradually sloping with steep slopes and varying aspects associated with a perennial creek, which is the main drainage (Figure 3). The site has a general western aspect and drains to the southwest. The elevation of the study area ranges from approximately 400 feet above sea level at the southern project boundary to approximately 575 feet at the northern access road.

Land Use

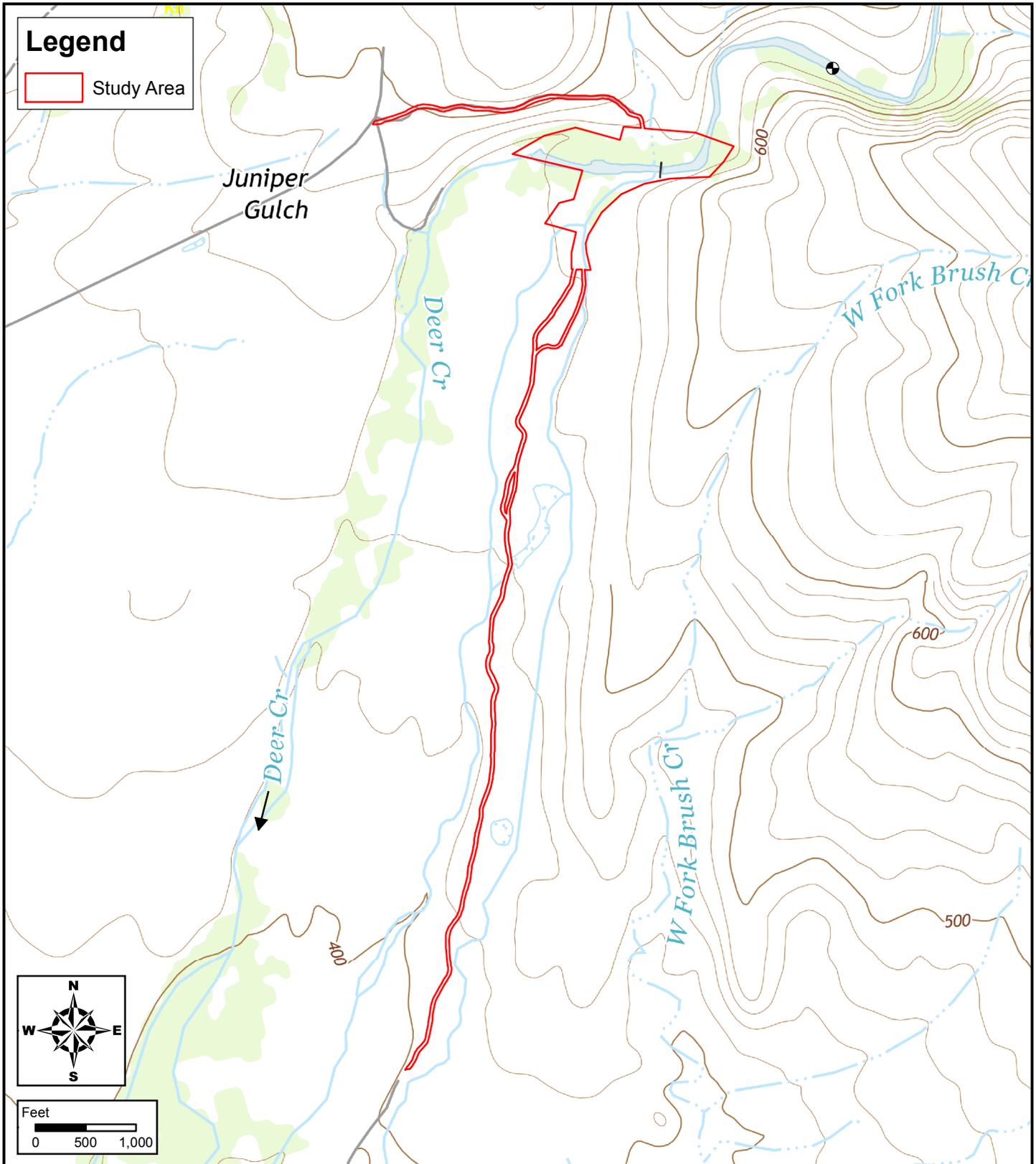
The study area is primarily used for livestock grazing and agricultural irrigation diversion. Additional uses in the general area include rock harvest and open space.



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FIGURE 1
 Site Vicinity Map



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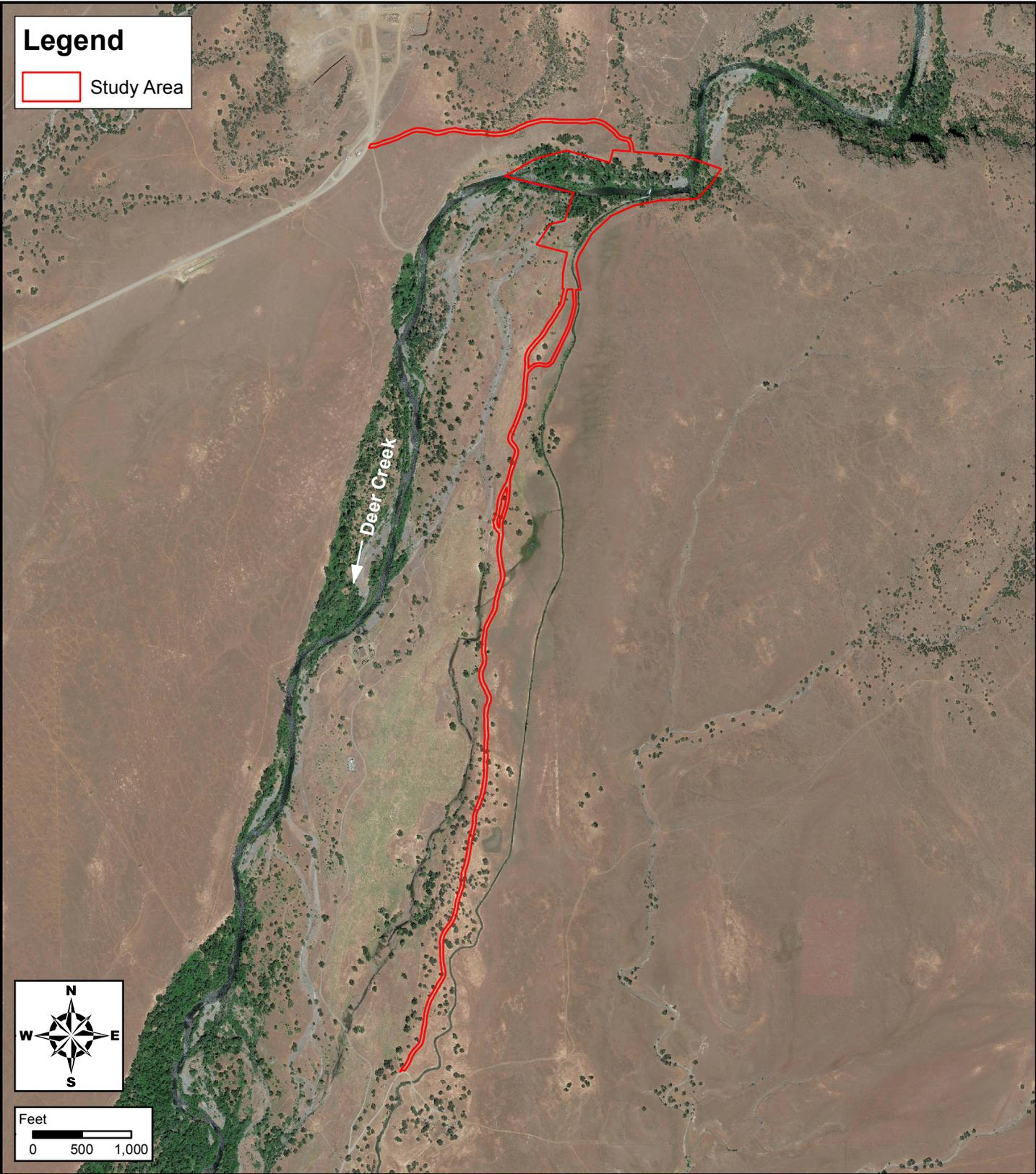
Delineation of Waters of the U.S.

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FIGURE 2
 Site Location Map



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FIGURE 3
 Site Aerial Photo Map

Hydrology

Deer Creek is an approximately 60-mile-long perennial stream flowing generally southwest, originating from the southern-facing slopes of Mount Lassen and eventually flowing into the Sacramento River near the town of Vina, California. The watershed includes a total area of 229 square miles which drains from northeast to southwest. Below the DCID dam, the creek flows for approximately eleven miles before reaching the Sacramento River.

The DCID diversion has an appropriative water right for 36 cubic feet per second (cfs) and is the main hydrologic feature in the study area (Northwest Hydraulic Consultants 2017). Water from the DCID diversion is conveyed through a constructed canal equipped with a fish screen. A bypass return pipe allows any fish entrapped in the canal to return to Deer Creek downstream. Diverted water that is passed through the screen is conveyed through a series of ditches to deliver irrigation and stock water to a number of DCID customers. In addition, an ephemeral stream feeds in to Deer Creek near the north access road. Small seasonal wetlands occur along the south access road to the study area.

Soils

Ten different soil map units occur within the study area according to the local soil survey (U.S. Department of Agriculture [USDA] – Soil Conservation Service et al. 1967). The ten identified map units are listed below:

Anita cobbly clay

These soils are located in small basins and in seep areas on high terraces east of the Sacramento River. Anita soils are formed in alluvium derived from volcanic rocks such as basalt and andesite. The soils are imperfectly drained, with very slow runoff and permeability. The soils generally have a hardpan or cemented layer at a depth of one to five feet. The taxonomy of the series is fine, montmorillonitic, thermic, Typic Durochrepts (Natural Resources Conservation Service 2018).

Keefers loam, 0 to 3 percent slopes

These soils are located on the eastern side of the Sacramento River on low terraces. They are formed on old alluvium, derived from basic igneous rock, mainly andesite and basalt, except along cracks. The soil is well-drained and permeability and runoff are both slow. Roots and water are restricted due to the clay subsoil at a depth that ranges from three feet to six feet or more. The taxonomy of the map unit is clayey-skeletal, montmorillonitic, thermic, Mollic Haploxeralfs (Natural Resources Conservation Service 2018).

Millrace gravelly fine sandy loam, 0 to 3 percent slopes

These soils are located east of the Sacramento River on narrow floodplains. They are formed in alluvium derived from basic volcanic rock. These soils are somewhat excessively-drained with very rapid permeability and very slow runoff. The taxonomy of the map unit is loamy-skeletal, mixed, thermic Pachic Haploxerolls (Natural Resources Conservation Service 2018).

Molinos fine sandy loam

These soils are located along active streams east of the Sacramento River and are formed from recent alluvium derived from basic igneous rocks, mainly andesite and basalt. These soils consist of well-drained to somewhat excessively-drained soils with moderately rapid permeability and very slow runoff. The taxonomy of the series is coarse-loamy, mixed, superactive, thermic Cumulic Haploxerolls (Natural Resources Conservation Service 2018).

Molinos complex, channeled

These soils are located along active streams east of the Sacramento River and are formed in recent alluvium derived from basic igneous rocks, mainly andesite and basalt. This complex consists of variable proportions of any of the Molinos soils. This soil is well-drained to somewhat excessively-drained and permeability varies based on the map units present in the complex. The taxonomy of the map unit is coarse-loamy, mixed, nonacid, thermic, Aquic Xerofluvents (A. Conlin pers. comm. 2017).

Riverwash

This soil map unit is made up of deposits of sand and gravel. It consists of channels of intermittent streams and of active streams where the water is high. The series is not classified by higher categories in the soil survey.

Toomes extremely rocky loam, 1 to 50 percent slopes

These soils are located east of the Sacramento River, formed in material derived from volcanic rock. They are well-drained with moderate permeability and medium runoff. The taxonomy of the map unit is lithic, loamy, mixed, thermic, Ruptic-Xerorthentic Xerochrepts (Natural Resources Conservation Service 2018).

Toomes very rocky loam, 30 to 50 percent slopes

These soils are located east of the Sacramento River, formed in material derived from volcanic rock. Hard volcanic breccia exists at a shallow depth and is impervious to roots and water. These soils are well-drained with moderate permeability and medium runoff. The taxonomy of the map unit is lithic, loamy, mixed, thermic, Ruptic-Xerorthentic Xerochrepts (Natural Resources Conservation Service 2018).

Tuscan cobbly loam, 1 to 5 percent slopes

These soils are located on the upper terraces east of the Sacramento River and formed from old alluvium washed from areas of volcanic rock. The soil is well-drained with very slow permeability and slow runoff. The subsoil is underlain by a hardpan which is impervious to roots and water, located at 10 to 20 inches in depth. The taxonomy of the map unit is fine, montmorillonitic, thermic, Typic Durixeralfs (Natural Resources Conservation Service 2018).

Tuscan very stoney loam, 3 to 15 percent slopes

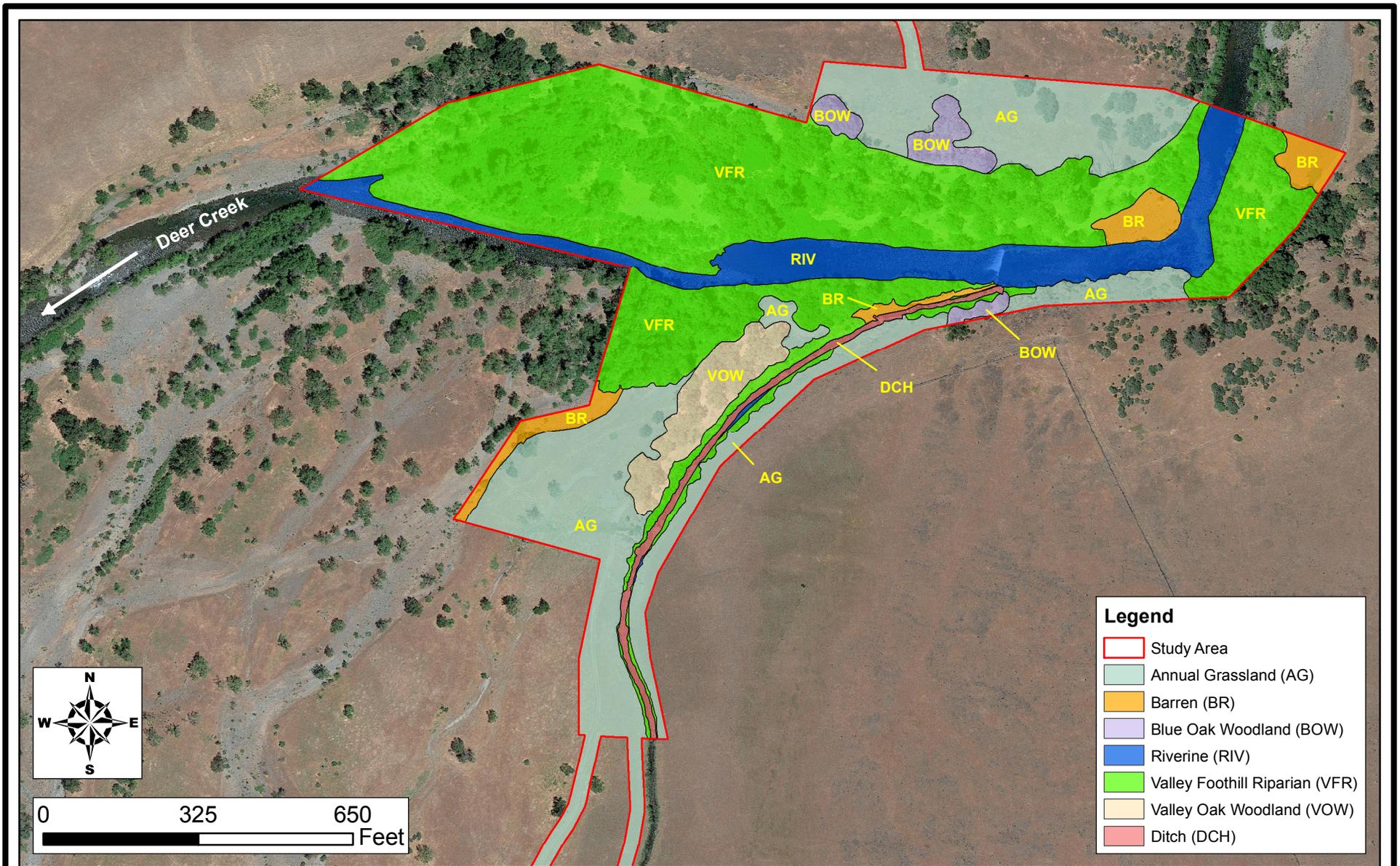
This series is located on the tops of old gently sloping terraces east of the Sacramento River. The soils are formed from old alluvium washed from areas of volcanic rock. The soil is well-drained with very slow permeability and slow runoff. The taxonomy of the map unit is fine, montmorillonitic, thermic, Typic Durixeralfs (Natural Resources Conservation Service 2018).

Vegetation / Plant Communities

Six habitat types generally occur within the study area as defined by the California Wildlife-Habitat Relationships classification system (Mayer and Laudenslayer 1988). The habitat types include: Valley Foothill Riparian, Annual Grassland, Blue Oak Woodland, Valley Oak Woodland, Barren and Riverine (Figure 4).

Annual Grassland

Annual grassland habitat is located primarily along the access routes. Dominant herbaceous species here include native and non-native annual grasses and forbs such as wild oats (*Avena fatua*), ripgut brome (*Bromus diandrus*), medusahead (*Taeniatherum caput-medusae*), fillaree (*Erodium sp.*), and foxtail fescue (*Festuca myuros*). Scattered blue oak (*Quercus douglasii*) are present in some areas.



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FIGURE 4
 California Wildlife
 Habitat Relationships Map

Barren

Areas of barren habitat exist where the creek has scoured away the vegetation during high flow events. These areas are characterized by the lack of, or sparse vegetation, and gravel and cobble composition associated with periodic stream deposits.

Blue Oak Woodland

Blue oak woodland occurs in small patches amongst the annual grassland habitat. The dominant woody plant species is blue oak with valley oak (*Quercus lobata*), gray pine (*Pinus sabiniana*), and interior live oak (*Quercus wislizenii*) as subdominants in some areas. There is no shrub layer for the majority of blue oak woodland, however buckbrush (*Ceanothus cuneatus*) and western juniper (*Juniperis occidentalis*) are present in areas.

Riverine

Riverine habitat is present within the channel of Deer Creek. The creek channel is primarily devoid of vegetation, but the exposed barren rock and gravel along both banks of the stream support woody and herbaceous species such as willows (*Salix spp.*), white alder (*Alnus rhombifolia*), buttonbush (*Cephalanthus occidentalis*), deer grass (*Muhlenburgia rigens*) and torrent sedge (*Carex nudata*).

Valley Foothill Riparian

Valley foothill riparian habitat occurs on both banks and floodplains within the study area. The dominant woody plant species include Fremont cottonwood (*Populus fremontii*), valley oak and California sycamore (*Platanus racemosa*). Additional species include Oregon ash (*Fraxinus latifolia*), white alder, narrow-leaved willow (*Salix exigua*), arroyo willow (*Salix lasiolepis*), mulefat (*Baccharis salicifolia*), fig (*Ficus carica*), California grape (*Vitis californica*), California blackberry (*Rubus ursinus*) and Himalayan blackberry (*Rubus armeniacus*). Blue elderberry (*Sambucus mexicana*) shrubs are also found on, and near the south bank, downstream of the dam. The sparse herbaceous layer includes native species such as deer grass, horsetail (*Equisetum sp.*) and mugwort (*Artemisia douglasiana*), along with other native and non-native grasses and forbs.

Valley Oak Woodland

Valley oak woodland habitat occurs in the southern portion of the study area along the irrigation ditch. The woodland is dominated by valley oak. Woody subdominants include California sycamore, hoary coffeeberry (*Rhamnus tomentella ssp. tomentella*) and blue elderberry. Native and non-native grasses and forbs dominate the ground cover.

METHODS

Data Base Records Searches

Prior to the initiation of field studies, a records search of the California Natural Diversity Data Base (CNDDDB) (California Department of Fish and Wildlife 2018a) was conducted to determine if any special-status animals, or rare natural communities had previously been documented within the study area, or in the vicinity of the study area. The query was conducted using the USGS Acorn Hollow 7.5' quadrangle, in which the project is located, along with the eight adjoining quadrangles (Dewitt Peak, Panther Spring, Ishi Caves, Vina, Richardson Springs NW, Campbell Mound, Los Molinos and Tuscan Springs). In addition, species lists for the study area were requested from the USFWS and the NMFS.

Based on the results of the CNDDDB search (Appendix A), the USFWS and NMFS species lists and TES's additional knowledge of the site and local area, a list of potentially occurring special-status species and

natural communities was developed for the project and is included as Appendix B. For the purposes of this evaluation, special-status species are defined as:

1. Those species listed by USFWS or NMFS as Endangered, Threatened, Proposed as Endangered or Threatened, Candidate to become Proposed or Species of Concern.
2. Those species listed by CDFW as Endangered, Threatened, Candidate for listing as Endangered or Threatened, Species of Special Concern or Fully Protected.

Special-status designations for faunal species are depicted in Appendix B. Designations were based on the most recent version of the special animals list (California Department of Fish and Wildlife 2018b).

Wildlife / Fisheries Survey

A biological survey was conducted on May 9, 11, 16, 18, and 23, 2018 and June 19, 2018 by Mr. Jeff Souza, TES Principal Biologist and Ms. Lorin Mills, TES Environmental Scientist. Additional biological data were collected by Mr. Souza on June 23, 2018 and on March 29, 2017, while working with Ms. Patricia Bratcher, Ms. Eda Eggeman, Dr. Richard Lis and Ms. Kristin Hubbard of CDFW. The study area included the entire project footprint, as well as a varying surrounding buffer area. The surveys were conducted by walking and / or driving portions of the study area that were accessible and recording direct wildlife observations. Observations were made using the unaided eye, binoculars and identification of vocalizations. Other methods included observations of animal tracks, scat and bird feathers. No protocol-level wildlife or fisheries surveys were conducted.

In addition, to survey for bat species, one to two Pettersson DX-500 full spectrum, ultrasound, acoustical recording devices were deployed during the nights of May 9, 10, 11, 12, 13 and 14, 2018. The survey was performed at a time of year that was favorable for detection of all bat species that could potentially occur at the site. The recording devices were deployed at three different locations in order to sample riparian, riverine and oak woodland habitats. A total of seven nights were sampled between the three sites. The sampling occurred from approximately 20 minutes after sunset to 20 minutes before sunrise. Once recorded, the potential bat calls were then analyzed using SonoBat™ 4.2.0 software to identify calls to the species level. Individual calls were then manually vetted by Mr. Souza to arrive at the final species list included in Appendix C.

Natural Communities

CDFW has recognized a number of rare, threatened, or unique natural communities that need protection. As part of the biological field surveys, potential rare natural communities were identified and documented.

RESULTS

California Natural Diversity Data Base Records Search

The results of the CNDDDB search indicate that one special-status animal species has previously been recorded within the study area boundary, Central Valley steelhead (*Oncorhynchus mykiss irideus*). Steelhead are federally listed as Threatened. The results of the CNDDDB search also indicate that one rare natural community has previously been recorded within the study area boundary, Central Valley Drainage Hardhead / Squawfish Stream.

A total of 22 additional special-status animal species occurrences have previously been documented in the larger surrounding USGS nine-quadrangle search area. Of the 22 special-status animal species, ten are state and / or federally listed as Threatened or Endangered including the Conservancy fairy shrimp (*Branchinecta conservatio*), vernal pool fairy shrimp (*Branchinecta lynchi*), vernal pool tadpole shrimp (*Lepidurus packardi*), Swainson's hawk (*Buteo swainsoni*), western yellow-billed cuckoo (*Coccyzus americanus occidentalis*), valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*), Central Valley spring-run Chinook salmon (*Oncorhynchus tshawytscha*), Sacramento River winter-run salmon (*Oncorhynchus tshawytscha*), bank swallow (*Riparia riparia*) and least Bell's vireo (*Vireo bellii pusillus*).

Two additional species are listed as candidate species. These include the tricolored blackbird (*Agelaius tricolor*), a state candidate for listing as Endangered, and the foothill yellow-legged frog (*Rana boylei*), a state candidate for listing as Threatened.

Eight additional rare natural communities have been documented previously in the CNDDDB within the larger nine USGS quadrangle search area. The natural communities include Central Valley Drainage Fall-Run Chinook Stream, Central Valley Drainage Spring-Run Chinook Stream, Central Valley Drainage Valley Floor River, Coastal and Valley Freshwater Marsh, Great Valley Cottonwood Riparian Forest, Great Valley Mixed Riparian Forest, Great Valley Valley Oak Riparian Forest and Great Valley Willow Scrub.

Wildlife / Fisheries Survey

Several special-status animal species were observed during the 2017 and 2018 field surveys. A list of all faunal species observed during site surveys is included in Appendix C.

There were three state and / or federally listed as Threatened or Endangered species observed during field surveys. These include the little willow flycatcher (*Empidonax traillii brewsteri*), state listed as Endangered; Swainson's hawk, state listed as Threatened; and rainbow trout / steelhead, federally listed as Threatened.

Tricolored blackbirds, a state candidate for listing as Endangered were also observed during surveys. Additionally, vernal pool tadpole shrimp, federally listed as Endangered were observed outside, but within approximately 200 feet of the study area during surveys conducted by TES and CDFW staff (Eggeman 2018).

Ten additional special-status species designated as CDFW Species of Special Concern or Fully Protected were observed during site surveys. These included the western pond turtle (*Emys marmorata*), American peregrine falcon (*Falco peregrinus anatum*), American white pelican (*Pelecanus erythrorhynchos*), golden eagle (*Aquila chrysaetos*), loggerhead shrike (*Lanius ludovicianus*), northern harrier (*Circus cyaneus*), Vaux's swift (*Chaetura vauxi*), yellow-breasted chat (*Icteria virens*), Pacific lamprey (*Entosphenus tridentatus*), and pallid bat (*Antrozous pallidus*). Several additional raptor species were also observed within, or in the vicinity of the study (Appendix C).

Natural Communities

In addition to the Central Valley Drainage Hardhead / Squawfish Stream natural community documented within the study area, the instream habitats could also potentially be classified as several additional CNDDDB rare instream natural communities. These include Central Valley Drainage Spring-Run Chinook Stream and Central Valley Drainage Fall-Run Chinook Stream.

There are also several terrestrial habitats in the study area that would likely be classified as CNDDDB rare natural communities. These include Great Valley Cottonwood Riparian Forest, Great Valley Mixed Riparian Forest, Great Valley Valley Oak Riparian Forest and Great Valley Willow Scrub.

EVALUATION

Several species, identified through the nine quadrangle CNDDDB data query and TES's professional knowledge of the local area, were eliminated from further evaluation in this report due to the lack of habitat within, or near the project site and / or that the project lies outside of the species known range (see Appendix B). Those species not eliminated are described below, along with an evaluation of potential impacts to the species from the proposed project.

Amphibians and Reptiles

Western Pond Turtle (*Emys marmorata*)

The western pond turtle is designated as a CDFW Species of Special Concern. Population declines are attributed to impacts to nesting habitat, nest and juvenile predation by non-native aquatic species, human-induced predator population increases and historic human overexploitation (Jennings and Hayes 1994). This species inhabits quiet waters of ponds, lakes, streams, etc., where there are rocks or logs for basking and safe underwater retreat areas (Stebbins 1972). They are closely tied to water except when females move overland to lay eggs or when either sex may move overland to upland sites to overwinter. They may overwinter on land or in water but are thought to be more likely to overwinter in water when inhabiting pond habitats. Egg-laying typically occurs in May and June but can occur from late April to early August, while overwintering generally begins in October or November (Jennings and Hayes 1994). Hatchlings are thought to overwinter in the nest and emerge to migrate to aquatic habitats the following spring (Jennings and Hayes 1994).

Western pond turtles were observed within the study area in Deer Creek and associated backwaters and side channels during TES site surveys. **Potentially significant impacts could occur if western pond turtles and / or turtle nests were present within the study area and turtles were harmed or killed, or turtle nests were destroyed by project construction activities.**

Foothill Yellow-legged Frog (*Rana boylei*)

The foothill yellow-legged frog is currently considered a state candidate for listing as Threatened and a CDFW Species of Special Concern. The main reported threat to the species is predation by introduced aquatic predators including fish and bullfrogs (Jennings and Hayes 1994). This species inhabits shallow flowing water in small to moderate-sized streams with some cobble-sized substrate (Jennings and Hayes 1994) in a variety of habitats including valley-foothill hardwood, valley-foothill hardwood-conifer, valley-foothill riparian, ponderosa pine, mixed conifer, coastal scrub, mixed chaparral and wet meadow from sea level to 6,000 feet in elevation (Ziener et al. 1988). Breeding occurs following the end of spring flooding from mid-March to May (Ziener et al. 1988). Adults forage on aquatic and terrestrial invertebrates and are rarely found far from permanent water (Ziener et al. 1988).

Foothill yellow-legged frogs are documented to occur in Deer Creek approximately 15 river miles upstream of the study area (California Department of Fish and Wildlife 2018a, M. Johnson pers. comm). Potential habitat is present in Deer Creek within the study area. This species was not observed during TES site surveys. No foothill yellow-legged frogs or egg masses were observed during CDFW focused foothill yellow-legged frog egg mass site surveys conducted in April and May of 2018 (P. Bratcher pers. comm.). **Potentially significant impacts could occur if foothill yellow-legged frogs were present within the study area and were harmed or killed by project construction activities.**

Western Spadefoot (*Spea hammondi*)

The western spadefoot is designated as a CDFW Species of Special Concern. Population declines are attributed to habitat conversion, introduction of non-native predators including fish, bullfrogs and crayfish; road construction, environmental pollution and exposure to activities that produce low frequency noise and vibration (U.S. Fish and Wildlife Service 2005). This species primarily inhabits grassland habitats but can occasionally occur in valley-foothill hardwood woodlands (Zeiner et al. 1988). Adults spend most of the year in underground burrows and initiate surface movements to breed in response to early fall rains. They require temporary rain pools that persist for a minimum of three weeks in order for the larvae to metamorphose successfully (Jennings and Hayes 1994). Breeding and egg-laying typically occur from late winter to the end of March (Zeiner et al. 1988). They forage on a variety of insects, worms and other invertebrates (U.S. Fish and Wildlife Service 2005).

The study area is within the northern end of the geographical distribution for this species. Western spadefoot are not likely to breed within the study area due to a lack of suitable breeding habitat, however potential breeding habitat for this species occurs within a large vernal pool near the south access haul road. It is not likely that the western spadefoot will be impacted by this project if they are present, as all project work will avoid such habitat and will be conducted within the existing road prism. Baseline conditions in the access roads within the study area include regular vehicle and equipment use for ranching, DCID and fish screen maintenance operations and other uses. **No significant impacts to western spadefoots are anticipated as a result of the proposed project.**

Birds

Tricolored Blackbird (*Agelaius tricolor*)

The tricolored blackbird is currently designated as a state candidate for listing as Endangered and a CDFW Species of Special Concern. Reported potential threats to the species include water diversion, land conversion and heavy predation by mammals, corvids and black-crowned night herons (Riparian Habitat Joint Venture 2004). This species constructs nests of mud and plant material in dense cattails or tules and thickets of willow, blackberry, wild rose and herbs (Zeiner et al. 1990a). Nesting is highly colonial and usually located in wetlands or in dense vegetation near open water (Riparian Habitat Joint Venture 2004). Nesting areas must generally be large enough to support approximately 50 pairs (Zeiner et al. 1990a). Tricolored blackbirds forage on seeds and insects in croplands, grasslands, flooded areas and edges of ponds (Zeiner et al. 1990a).

The study area lacks sufficient breeding habitat for tricolored blackbird due to the lack of wetlands with dense vegetation of a sufficient size. Potential foraging habitat is present within the project site. Tricolored blackbirds were observed flying through the study area during site surveys. This species may forage within the site if breeding colonies are located in the general area, however impacts to foraging activities would not generally be considered significant due to the fact that foraging habitat is not limited regionally and due to the temporary nature of the project construction activities. **No significant impacts to tricolored blackbirds are anticipated as a result of the proposed project.**

Grasshopper Sparrow (*Ammodramus savannarum*)

The grasshopper sparrow is a CDFW Species of Special Concern. Reported potential threats to the species include urbanization, expansion of vineyards and fire suppression, if any of these leads to grassland converting into unsuitable habitats such as dense scrub (Shuford and Gardali 2008). The grasshopper sparrow is more likely to be found in large tracts of habitat than in small ones. Minimum area requirements are approximately 100 hectares (247 acres) in Maine and 30 hectares (74 acres) in Illinois. In general, grasshopper sparrows in California prefer short to middle-height, moderately open grasslands with scattered shrubs (Shuford and Gardali 2008). The breeding season for this species extends from mid-March to August. This species builds nests domed with grasses and forbs with a side

entrance, in a slight depression in the ground, hidden at the base of an overhanging clump of grasses or forbs, with the rim approximately level to the ground (Shuford and Gardali 2008). The grasshopper sparrow diet is roughly 63 percent animal matter (mainly grasshoppers) and 37 percent vegetable (plants / seeds), and they forage primarily on the ground (bare ground is critical microhabitat for effective foraging) or from low vegetation (Shuford and Gardali 2008).

Grassland habitat along the access routes provides potential nesting and foraging habitat for this species. Grasshopper sparrows were not observed during site surveys. The species may forage within the site if nesting or roosting in the general area, however impacts to foraging activities would not generally be considered significant due to the temporary nature of the project construction activities. **Potentially significant impacts could occur if grasshopper sparrows were nesting within, or near the study area and were disturbed by project construction activities.**

Golden Eagle (*Aquila chrysaetos*)

The golden eagle is designated as a Fully Protected Species under the California Fish and Game Code and is protected by the Bald and Golden Eagle Protection Act. This species has declined near human population centers (Remsen 1978). The loss and alteration of grasslands, shooting, and human disturbance at nest sites are reported to have contributed to the decline of the species (Remsen 1978). The golden eagle is a permanent resident throughout California, except in the center of the Central Valley, although it winters in this area (Zeiner et al. 1990a). Golden eagles typically inhabit rolling foothills, mountainous areas, sage-juniper flats, and deserts (Zeiner et al. 1990a). It breeds from late January through August, peaking from March through July, and nests on cliffs and in large trees near open areas. Golden eagles often maintain alternative nest sites and old nests are often reused (Zeiner et al. 1990a). The golden eagle needs open areas for hunting and their diet consists mostly of lagomorphs and rodents, but also includes other mammals, reptiles, birds and some carrion (Zeiner et al. 1990a).

Golden eagles are not likely to nest within the study area to a lack of preferred nesting habitat. A golden eagle was observed during site surveys. This species may forage within the project site, however impacts to foraging activities would not generally be considered significant due to the fact that foraging habitat is not limited regionally and due to the temporary nature of the project construction activities. **No significant impacts to golden eagles are anticipated as a result of the proposed project.**

Short-eared Owl (*Asio flammeus*)

The short-eared owl is designated as a Species of Special Concern by CDFW. Reported threats to short-eared owls include shooting, habitat loss and degradation, grazing, invasive exotic weeds, water management and disease (Shuford and Gardali 2008). A year-round resident in certain areas within California, this species breeds most regularly in northeastern California and in the Suisun Marsh (Shuford and Gardali 2008). Geographic range or abundance is difficult to describe due to breeding range fluctuations which follow prey availability and abundance cycles (Shuford and Gardali 2008). Nesting short-eared owls require open country such as saltwater and freshwater marshes, irrigated alfalfa or grain fields and ungrazed grasslands and old pastures which support rodents such as voles, lemming and muskrats. The breeding season stretches from March through July. This species requires herbaceous cover sufficient to conceal their ground nests from predators (Shuford and Gardali 2008). Short-eared owls mainly feed on small mammals.

Short-eared owls are not likely to nest within the study area due to the fact that the study area is well outside of the current known breeding range for the species. The species was not observed during site surveys. Winter foraging habitat is present within the project site, however impacts to foraging activities would not generally be considered significant due to the fact that foraging habitat is not limited regionally and due to the temporary nature of the project construction activities. **No significant impacts to short-eared owls are anticipated as a result of the proposed project.**

Long-eared Owl (*Asio otus*)

The long-eared owl is designated as a Species of Special Concern by CDFW. Declines in long-eared owl populations have been attributed to destruction of lowland riparian woodland habitats, however other unknown factors such as automobile collisions and human harassment may also be contributing factors (Remsen 1978). This species nests and roosts in riparian, live oak or other thickets with small, densely-canopied trees, and primarily hunts in open areas for rodents, as well as birds, smaller owls and other vertebrates (Zeiner et al. 1990a). Breeding occurs from early March to late July (Zeiner et al. 1990a).

Long-eared owls may nest in the riparian areas or dense upland woodlands within and near the study area. This species was not observed during site surveys. The species may forage within the site if nesting or roosting in the general area, however impacts to foraging activities would not generally be considered significant due to the fact that foraging habitat is not limited regionally, the temporary nature of the project construction activities and the fact that this species typically forages at night when construction activities would not normally occur. **Potentially significant impacts could occur if long-eared owls were nesting within, or near the study area and project construction activities destroyed a nest or caused them to abandon active nests.**

Burrowing Owl (*Athene cunicularia*)

The burrowing owl is a CDFW Species of Special Concern. Population declines are attributed to conversion of grassland to agriculture, other habitat destruction and poisoning of ground squirrels (Remsen 1978). Collisions with automobiles may also be a significant cause of mortality. Burrowing owls are yearlong residents of open, dry grassland, desert habitats and open shrub stages of pinyon-juniper and ponderosa pine habitats. This species eats mostly insects, small mammals, reptiles, birds and carrion. They use ground squirrel or other burrows for roosting and nesting cover, or they may dig their own burrow in soft soil.

Burrowing owls are not likely to nest within the study area due to a lack of nesting habitat, however potential nesting, roosting and foraging habitat for this species occurs near the study area within the grasslands located adjacent to the access haul roads. No burrowing owls or potential burrows were observed during site surveys. **Potentially significant impacts could occur if burrowing owls were nesting or roosting near the study area and were disturbed by project construction activities.**

Swainson's Hawk (*Buteo swainsoni*)

The Swainson's hawk was listed as Threatened by the State of California in 1983. Threats include loss and conversion of native grasslands and agricultural lands to development, loss of mature riparian forest habitat, shooting, pesticide poisoning and human disturbance at nest sites (Remsen 1978, California Department of Fish and Game 2005). Recovery efforts are focused on preservation of riparian systems and other nesting habitat, conservation of foraging habitat, maintenance of agricultural practices that are compatible with foraging requirements and minimizing disturbance near nests (California Department of Fish and Game 2005). In California, they now nest primarily in the Central Valley and the Great Basin regions (California Department of Fish and Game 2005). Some individuals are neotropical migrants that winter in Mexico and South America. They typically nest from March through August in large trees in riparian habitat, in scattered trees, or small groves in sparsely vegetated flatlands (Zeiner et al. 1990a). They forage in large open grasslands, open agricultural fields and livestock pastures taking mice, gophers, ground squirrels, rabbits, large arthropods, amphibians, reptiles, birds and rarely, fish (Zeiner et al. 1990a).

The study area is within the northern end of the geographical breeding range for this species. Potential Swainson's hawk nesting habitat is present in riparian habitats and potential foraging habitat is present throughout the study area. This species was observed during site surveys and an active nest was observed in the vicinity of the southern access road. The species may forage within the study area if nesting in the

general area, however impacts to foraging activities would not generally be considered significant due to the fact that foraging habitat is not limited regionally and due to the temporary nature of the project construction activities. **Potentially significant impacts could occur if Swainson's hawks were nesting within, or near the study area and were disturbed by project construction activities.**

Vaux's Swift (*Chaetura vauxi*)

The Vaux's swift is designated as a CDFW Species of Special Concern. Threats to this species are not well-documented but losses of suitable nesting trees due to timber harvest may be a concern. This species nests inside large hollow trees in redwood, Douglas fir and other conifer habitats (Zeiner et al. 1990a). Breeding occurs from early May to mid-August and often occurs in large colonies (Zeiner et al. 1990a). They feed exclusively on flying insects and forage widely during long-distance high-elevation flights over varying terrain, but prefer to forage over rivers and lakes.

Vaux's swifts would not be expected to nest within, or immediately near the study area due to the fact that the study area is well outside of the known breeding range of the species, and due to a lack of potential nesting habitat within the vicinity of the project site. Foraging habitat exists within the study area for Vaux's swifts and they were observed foraging during the site surveys. The species may forage within the site during spring and fall migrations, however impacts to foraging activities would not generally be considered significant due to the fact that foraging habitat is not limited regionally and due to the temporary nature of the project construction activities. **No significant impacts to Vaux's swifts are anticipated as a result of the proposed project.**

Northern Harrier (*Circus cyaneus*)

The northern harrier is a CDFW Species of Special Concern. Reported threats to the species include destruction of marsh habitat, burning and plowing of nesting areas and grazing in grassland nesting habitat (Remsen 1978, Zeiner et al. 1990a). This species nests from April to September on the ground in emergent wetlands, grasslands, agricultural fields or on sagebrush flats (Zeiner et al. 1990a). They forage in open areas consuming small mammals, birds, frogs, small reptiles, crustaceans, insects and rarely, fish (Zeiner et al. 1990a).

Northern harriers are not likely to nest within the study area due to a lack of nesting habitat, however potential nesting and foraging habitat for this species occurs near the study area within the grasslands located adjacent to the access haul roads. Northern harriers were observed near the study area during site surveys. The species may forage within the site if nesting in the general area, however impacts to foraging activities would not generally be considered significant due to the fact that foraging habitat is not limited regionally and the temporary nature of the project construction activities. **Potentially significant impacts could occur if northern harriers were nesting near the study area and were disturbed by project construction activities.**

Western Yellow-billed Cuckoo (*Coccyzus americanus occidentalis*)

The western Distinct Population Segment (DPS) of the yellow-billed cuckoo was federally listed as Threatened by USFWS in 2014. Critical Habitat (CH) for this species was designated by USFWS on December 2, 2014. The western yellow-billed cuckoo was listed as Endangered by the State of California in 1971. Reported threats to the species include habitat loss (Zeiner et al. 1990a). They use extensive deciduous willow-dominated riparian thickets or forests with dense, low-level or understory foliage, which abut slow-moving watercourses, backwaters or seeps and also utilize adjacent orchards in the Sacramento Valley. The western yellow-billed cuckoo typically nests in sites within riparian habitat in excess of 50 acres in size (Haltermann et al. 2016). Nests are a delicate, open cup of twigs built on horizontal limbs of trees or shrubs at heights of two to 25 feet. They forage on grasshoppers, cicadas, caterpillars, other larger insects and occasionally on frogs, lizards or fruit.

The western yellow-billed cuckoo is not likely to nest within the study area due to a lack of habitat that meets the species' minimum size requirements. The study area is located approximately ten river miles away from the nearest documented nesting location near the mouth of Deer Creek and the Sacramento River (California Department of Fish and Wildlife 2018a). This species was not observed during site surveys, although protocol-level surveys were not conducted. Foraging habitat is present within the riparian areas of the project site. The species may forage within the site if nesting near the study area or during dispersal, however impacts to foraging activities would not generally be considered significant due to the fact that foraging habitat is not limited regionally and the temporary nature of the project construction activities. **No significant impacts to western yellow-billed cuckoos are anticipated as a result of the proposed project.**

Black Swift (*Cypseloides niger*)

The black swift is designated as a CDFW Species of Special Concern. Threats to this species are unclear but may include human disturbance of nesting activities due to rock climbing (Remsen 1978). Black swifts construct mud and plant material nests in moist crevices on sea cliffs or adjacent to, or behind waterfalls (Zeiner et al. 1990a). Nesting occurs in small colonies from early June to late August (Zeiner et al. 1990a). They feed exclusively on flying insects and forage widely during long-distance flights.

Black swifts would not be expected to nest within, or immediately near the project site due to the fact that the study area is well outside of the known breeding range of the species and due to a lack of potential nesting habitat within the vicinity of the project site. No black swifts were observed during the site surveys. The species may forage within the site during spring and fall migrations, however impacts to foraging activities would not generally be considered significant due to the fact that foraging habitat is not limited regionally and the temporary nature of the project construction activities. **No significant impacts to black swifts are anticipated as a result of the proposed project.**

White-tailed Kite (*Elanus caeruleus*)

The white-tailed kite is designated as a Fully Protected species under the California Fish and Game Code. The species has extended its range and increased in numbers in recent decades (Zeiner et al. 1990a). They are rarely found away from agricultural areas and nest from February to October near the tops of trees in dense oak, willow or other tree stands, near open foraging areas (Zeiner et al. 1990a). They forage on small mammals and occasionally on birds, insects, reptiles and amphibians in undisturbed open grasslands, meadows, farmlands and emergent wetlands (Zeiner et al. 1990a).

Potential nesting habitat is present within the study area. White-tailed kites were not observed during field surveys. Potential foraging habitat is present in open grasslands near the study area and the species may forage if nesting near the study area, however impacts to foraging activities would generally not be considered significant due to the fact that foraging habitat is not limited regionally and the temporary nature of the project construction activities. **Potentially significant impacts could occur if white-tailed kites were nesting within, or near the study area and were disturbed during project construction activities.**

Little Willow Flycatcher (*Empidonax traillii brewsteri*)

The little willow flycatcher, a subspecies of the willow flycatcher, was listed by the State of California as Endangered in 1991. The little willow flycatcher was once a common breeder in Central Valley riparian habitats but nesting appears now to be restricted to upper elevations. Reported potential threats to the species include riparian habitat loss, livestock grazing and nest parasitism by brown-headed cowbirds (*Molothrus ater*) (California Department of Fish and Game 2005). They nest in dense willow thickets in upper elevations near rivers, streams and lakes (Zeiner et al. 1990a).

There is a low likelihood that little willow flycatcher would nest within the study area due to the low elevation of the site. Little willow flycatchers were observed in May 2018 during site surveys but were not observed during June 2018 surveys, indicating that they were likely migrating through the area to higher elevations. The species may forage within the site during spring and fall migration, however impacts to foraging activities would generally not be considered significant due to the fact that foraging habitat is not limited regionally and due to the temporary nature of the project construction activities. **No significant impacts to little willow flycatchers are anticipated as a result of the proposed project.**

American Peregrine Falcon (*Falco peregrinus anatum*)

The American peregrine falcon is designated as a Fully Protected species under the California Fish and Game Code. The species was previously listed as Endangered by the State of California and was delisted in 2009. The species was originally listed as Endangered by USFWS and was delisted in 1999. Declines in population associated with this species are attributed primarily to dichlorodiphenyltrichloroethane (DDT) contamination (Zeiner et al. 1990a). Riparian areas and coastal and inland wetlands are important habitats year-long, especially in non-breeding seasons. They require protected cliffs and ledges for cover. They breed near wetlands, lakes, rivers or other waters, and nest on cliff ledges, human structures and occasionally, in cavities in large snags and old nests from other raptors. The American peregrine falcon feeds primarily on birds including ducks, and also takes mammals and fish.

There is a lack of nesting habitat within the study area, due to the lack of cliffs or other suitable nesting habitat, however there may be potential nesting habitat in the vicinity of the study area associated with high voltage power line towers near the north and south access roads. Peregrine falcons were observed during site surveys. Foraging habitat is present within the study area, however impacts to foraging activities would generally not be considered significant due to the temporary nature of the project construction activities and the fact that extensive foraging habitat is available regionally. **Potentially significant impacts could occur if American peregrine falcons were nesting near the study area and were disturbed during project construction activities.**

American Bald Eagle (*Haliaeetus leucocephalus*)

The American bald eagle was listed as Endangered by the State of California in 1971, and is designated as a Fully Protected species under the California Fish and Game Code and is protected by the Bald and Golden Eagle Protection Act. The species was originally listed as Endangered by USFWS in 1967, was downlisted to Threatened in 1995 and was delisted in 2007. Past declines in American bald eagle populations are attributed to the effects of DDT, lead shot and habitat disturbance, however in California, the number of territories has increased and the species range has expanded (California Department of Fish and Game 2005). Recovery efforts have focused on the protection of nesting areas and restrictions on the use of DDT. The American bald eagle is a large bird of prey that winters throughout California. They nest in the upper canopy of large trees normally in mountain and foothill habitats near rivers, streams and reservoirs. They forage opportunistically on fish and waterfowl but also prey on other small animals and eat carrion (California Department of Fish and Game 2005).

Potential nesting habitat is present in riparian habitats within the study area. No American bald eagle nesting activity is known to occur in the general area, however potential still exists for new nesting territories to be established. American bald eagles were observed during site surveys and it is likely that bald eagles are present at various times of the year foraging and / or roosting within, or near, the study area. Foraging habitat is present within the study area, however impacts to foraging activities would generally not be considered significant due to the fact that foraging habitat is not limited regionally and due to the temporary nature of the project construction activities. One of the purposes of the proposed project is to improve passage conditions for migrating native adult and juvenile fish, which may benefit bald eagles if fish populations increase as a result of the project. **However, potentially significant**

impacts could occur if American bald eagles were nesting within the vicinity of the study area and were disturbed during project construction activities.

Yellow-breasted Chat (*Icteria virens*)

The yellow-breasted chat is designated as a CDFW Species of Special Concern. Threats to the species include destruction of riparian habitat and nest parasitism by brown-headed cowbirds (Remsen 1978). Yellow-breasted chats are neotropical migrant songbirds that nest in dense shrubs along streams and rivers and require dense, brushy thickets and tangles near water for cover. They nest from early May to early August with peak nesting activity in June, and forage on insects, spiders, berries and other fruit (Zeiner et al. 1990a).

Potential nesting habitat is present in riparian habitats within the study area. Yellow-breasted chats were observed within the study area during field surveys. Foraging habitat is present within the study area, however impacts to foraging activities would generally not be considered significant due to the fact that foraging habitat is not limited regionally and due to the temporary nature of the project construction activities. **Potentially significant impacts could occur if yellow-breasted chats were nesting within, or near the study area and were disturbed during project construction activities.**

Loggerhead Shrike (*Lanius ludovicianus*)

The loggerhead shrike is a CDFW Species of Special Concern. Potential threats and reasons for population declines are not well-documented for this species although habitat loss, on breeding and wintering grounds as well as along migratory routes, is a major threat to the species. Loggerhead shrikes construct nests in dense foliage in trees or shrubs in areas with open habitat and scattered shrubs, trees, or other perches. They are found primarily in valley foothill hardwood, hardwood-conifer and riparian habitats as well as pinyon-juniper, juniper and desert riparian Joshua tree habitats (Zeiner et al. 1990a). Nesting occurs from March into May, with young becoming independent in July and August (Zeiner et al. 1990a). They feed primarily on large insects but also take small birds, mammals, amphibians, reptiles, fish, carrion and other invertebrates (Zeiner et al. 1990a).

Potential nesting habitat is present in tree and shrub habitats within the study area for loggerhead shrikes. A loggerhead shrike was observed within the study area during field surveys. Potential foraging habitat is present within the study area, however impacts to foraging activities would generally not be considered significant due to the fact that foraging habitat is not limited regionally and due to the temporary nature of the project construction activities. **Potentially significant impacts could occur if loggerhead shrikes were nesting within, or near the study area and were disturbed during project construction activities.**

American White Pelican (*Pelecanus erythrorhynchos*)

The American white pelican is a CDFW Species of Special Concern. Threats to this species include human disturbance, pesticide use and degradation of breeding habitat. Natural predators include gulls, coyotes and colony interactions. They are found on large lakes and estuaries in the Central Valley and coastal slopes. Pelicans rest during the day and roost at night, along edges of water, on beaches, sandbars, or old driftwood, but never in trees. They are a monogamous, colonial nester in groups of a few to several hundred pairs. They begin nest construction in March or April and begin egg-laying in April (Shuford and Gardali 2008). Young pelicans are independent by September (Zeiner et al. 1990a).

American white pelicans are not likely to nest within the study area due to a lack of suitable nesting habitat. During site surveys, this species was observed flying at high elevations over the project site. Marginal foraging habitat is present within the study area and they may forage in the project area, however impacts to foraging activities would generally not be considered significant due to the fact that foraging habitat is not limited regionally and due to the temporary nature of the project construction

activities. **No significant impacts to American white pelicans are anticipated as a result of the proposed project.**

Bank Swallow (*Riparia riparia*)

The bank swallow was listed as Threatened by the State of California in 1989. Bank swallow declines have been attributed to the elimination of nesting habitat due to channelization of rivers and flood control projects, particularly rip-rapping of natural stream banks (California Department of Fish and Game 2005). Recovery efforts are focused on preserving habitat and restoring naturally meandering riverine ecosystems (California Department of Fish and Game 2005). The bank swallow is a neotropical migrant species that winters in South America. They are a colonial nesting species that burrows into fine-textured vertical stream banks to construct their nests from early May through July (Zeiner et al. 1990a). Most of California's remaining populations nest along the upper Sacramento River in areas where natural stream meander still occurs. They forage by hawking insects during flight, feeding primarily over water and riparian areas.

It is unlikely that bank swallows would nest within the study area due to the lack of suitable nesting habitat (vertical stream banks with suitable soil texture for burrowing). Vertical stream banks are present, however bank soils lack fine loamy layers. No bank swallows were observed and no evidence of nests was found during site surveys. The study area is located approximately eight river miles away from the nearest documented nesting location near the mouth of Deer Creek and the Sacramento River (Bratcher 2018). Potential foraging habitat is present within the study area, however impacts to foraging activities would generally not be considered significant due to the fact that foraging habitat is not limited regionally and due to the temporary nature of the project construction activities. **No significant impacts to bank swallows are anticipated as a result of the proposed project.**

Yellow Warbler (*Setophaga petechia*)

The yellow warbler is designated as a CDFW Species of Special Concern. Threats to the species include destruction of riparian habitat and nest parasitism by brown-headed cowbirds (Remsen 1978). Numbers of breeding pairs have declined dramatically in recent decades in lowland areas. Yellow warblers are neotropical migrant songbirds that nest in riparian woodlands as well as in montane chaparral and in the shrubby understory of ponderosa pine and mixed conifer forests (Zeiner et al. 1990a, Shuford and Gardali 2008). They nest from mid-April into early August, with peak nesting activity in June, and eat insects, spiders and occasionally berries (Zeiner et al. 1990a).

Potential nesting habitat is present in the riparian areas within the study area. No yellow warblers were observed during site surveys. This species is likely to forage within the project site during spring and fall migration if nesting does not occur locally, however impacts to foraging activities would generally not be considered significant, due to the fact that foraging habitat is not limited regionally and due to the temporary nature of the project construction activities. **Potentially significant impacts could occur if yellow warblers were nesting within the vicinity of the study area and were disturbed during project construction activities.**

Other Nesting Raptors

Nesting habitat exists within, and near the project site for several other raptor species (eagles, hawks and owls) that are not identified as special-status species, but are protected under several sections of the California Fish and Game Code. Several raptor species were observed during site surveys (Appendix C). A number of additional raptor species, while not observed, may potentially nest within, or near the study area. Several large and medium-sized nests were observed within, or in the vicinity of the study area that could potentially serve as raptor nests. **Potentially significant impacts could occur if active raptor nests were present within the vicinity of the study area and project construction activities destroyed active nests or caused nests to be abandoned.**

Other Nesting Migratory Birds

Nesting habitat exists within the project site for a number of migratory bird species that are not identified as special-status species, but are protected under the federal Migratory Bird Treaty Act and / or under several sections of the California Fish and Game Code (California Department of Fish and Wildlife and California Attorney General 2018). **Potentially significant impacts could occur if active migratory bird nests were destroyed during project construction activities or caused nesting migratory birds to abandon active nests.**

Fish

Riffle Sculpin (*Cottus gulosus*)

The riffle sculpin is designated as a CDFW Species of Special Concern. It is reported that the riffle sculpin faces numerous threats from dams, agricultural runoff, urbanization mining and logging (Moyle et al. 2015). Both adult and young riffle sculpin have poor dispersal abilities (Moyle et al. 2015). Larvae do not move far after hatching and this greatly reduces their ability to quickly recolonize areas (Moyle et al. 2015). They are found in isolated watersheds in the Central Valley and the central coast. In the Sacramento River drainage, they are found in Putah Creek, a west-side tributary and in most of the east-side tributaries, from the American River north to the upper Sacramento and McCloud rivers. Riffle sculpin are found exclusively in permanent coldwater streams. This species spawns at the end of their second year, in February, March and April (Moyle et al. 2015). Adults spawn under rocks in swift riffles or inside cavities in submerged logs. Riffle sculpin feed mainly on benthic invertebrates, primarily active insect larvae.

Riffle sculpin are known to be present in the project reach of Deer Creek (M. Johnson pers. comm.). Riffle sculpin were not observed during site surveys, however intensive fish surveys were not conducted. One of the purposes of the proposed project is to improve passage conditions for migrating native adult and juvenile fish, which will also likely benefit riffle sculpin. **However, potentially significant impacts could occur if riffle sculpin were present within the study area and were harmed or killed by construction activities.**

Pacific Lamprey (*Entosphenus tridentatus*)

The Pacific lamprey is designated as a CDFW Species of Special Concern. It is reported that Pacific lamprey face numerous threats including, but not limited to reduction in prey abundance, due to stressors such as dams, diversions, habitat degradation and over-exploitation (Moyle et al. 2015). Pacific lamprey spend three to four years in the ocean before migrating, sometimes considerable distances, to freshwater streams mainly from March to late June (Moyle et al. 2015). They are believed to migrate in July in northern streams and in August and September in the Trinity River and can travel approximately 1.2 miles per day (Moyle et al. 2015). Pacific lamprey usually spawn in shallow depressions in low-gradient riffles, however nests have been observed in approximately five feet of water in Deer Creek (Moyle et al. 2015). Both adults usually die after spawning and embryos hatch after 19 days in temperatures of 15°C / 59°F (Moyle et al. 2015). After hatching, ammocoetes (juveniles) stay in the nest briefly and are then washed downstream where they burrow into soft stream sediments and filter feed for the next five to seven years until metamorphosis (Moyle et al. 2015). Once ammocoetes transform to adults and begin to tolerate salt water, they begin their downstream migrations in high flow events during the winter and spring (Moyle et al. 2015). Adults feed on body fluids of salmon, flatfishes and marine mammals larger than themselves during their oceanic existence (Moyle et al. 2015).

Adult Pacific lamprey are known to migrate through and spawn near the study area and juveniles are known to rear within the study area (M. Johnson pers. comm.). Pacific lamprey were observed within the study area during TES site surveys. In addition, CDFW observed Pacific lamprey spawning within the study area during foothill yellow-legged frog surveys (P. Bratcher pers. comm.). One of the purposes of

the proposed project is to improve passage conditions for migrating native adult and juvenile fish, which would likely benefit Pacific lamprey. **However, potentially significant impacts could occur if Pacific lamprey were present within the study area and were harmed or killed by project construction activities.**

Hardhead (*Mylopharodon conocephalus*)

The hardhead is a CDFW Species of Special Concern. This species inhabits undisturbed mid- to low-elevation streams that have clear, deep pools with sand, gravel and boulder substrates and low water velocities (Moyle et al. 2015). Threats to the species include loss of habitat from changes in stream flows and temperature regimes, elimination of habitat due to dams, and predation by non-native fish species (Moyle et al. 2015). In the Sacramento River system, they are widely distributed in most of the larger tributaries as well as the river.

Adult and juvenile hardhead are known to occur within the study area (M. Johnson pers. comm.). Hardhead were not observed during site surveys, however intensive fish surveys were not conducted. One of the purposes of the proposed project is to improve passage conditions for migrating native adult and juvenile fish, which would likely benefit hardhead. **However, potentially significant impacts could occur if hardhead were present within the study area and were harmed or killed by construction activities.**

Central Valley Steelhead (*Oncorhynchus mykiss*)

The Central Valley steelhead DPS was listed as Threatened by NMFS on May 18, 1998 and February 6, 2006. CH was designated by NMFS on September 2, 2005. Essential Fish Habitat (EFH) has not been designated by NMFS. Population declines are attributed to blockage from upstream habitats, entrainment from unscreened diversions, hatchery practices and degraded habitat conditions due to water development and land use practices. Steelhead are generally distributed from southern California to the Aleutian Islands. In the Central Valley, naturally producing populations occur in the Sacramento River and its tributaries. Steelhead stocks in the Central Valley are considered winter-run steelhead (McEwan and Jackson 1996). Central Valley steelhead adult migration occurs from October through February. Spawning occurs from December through April in streams with cool, year-round, well-oxygenated water. Incubation generally occurs from December through April. Emigration occurs in the spring and early summer as one-year-old fish.

The study area is located in the currently designated CH for Central Valley steelhead. They are known to occur within the study area reach of Deer Creek and are also known to migrate through, and spawn upstream of the study area (M. Johnson pers. comm.). Juvenile steelhead are also known to use the study area reach of Deer Creek for rearing (M. Johnson pers. comm.). Rainbow trout / steelhead were observed during site surveys. One of the purposes of the proposed project is to improve passage conditions for migrating native adult and juvenile fish, including Central Valley steelhead. **However, potentially significant impacts could occur if Central Valley steelhead were present within the study area and were harmed or killed by project construction activities.**

Central Valley Fall- / Late Fall-run Chinook Salmon (*Oncorhynchus tshawytscha*)

The Central Valley fall-run and late fall-run Chinook salmon are designated as a NMFS Species of Concern and as a CDFW Species of Special Concern. EFH was designated by NMFS on June 28, 2005. Population declines are attributed primarily to overfishing, unscreened diversions, and stream spawning and rearing habitat degradation. Central Valley fall-run Chinook salmon adult migration occurs in the Sacramento River from July through December. The peak of spawning occurs in October and November, incubation occurs from October through March, and rearing and emigration occurs from January through June. A majority of juvenile fish out-migrate within the first few months after emergence, but a small number remain in freshwater and out-migrate the following year. Central Valley late fall-run Chinook

salmon overlap the fall-run spawning migration and enter the Sacramento River from mid-October through mid-April. Spawning occurs in the Sacramento River and tributaries from January through mid-April, incubation occurs from January through June, and rearing and emigration occurs from April through mid-December.

The study area is located in the currently designated EFH for Central Valley fall- / late fall-run Chinook salmon. They are known to occur within the study area reach of Deer Creek and are also known to migrate through, and spawn upstream of the study area (M. Johnson pers. comm.). Juvenile fall- / late fall-run salmon are also known to use the study area reach of Deer Creek for rearing (M. Johnson pers. comm.). Central Valley fall- / late fall-run Chinook salmon were not observed during site surveys, however intensive fish surveys were not conducted. One of the purposes of the proposed project is to improve passage conditions for migrating native adult and juvenile fish, including Central Valley fall- / late fall-run Chinook salmon. **However, potentially significant impacts could occur if Central Valley fall- / late fall-run Chinook salmon were present within the study area and were harmed or killed by project construction activities.**

Central Valley Spring-run Chinook Salmon (*Oncorhynchus tshawytscha*)

The Central Valley spring-run Chinook salmon was listed as Threatened by the State of California on February 5, 1999. NMFS listed the Central Valley spring-run Chinook salmon Evolutionary Significant Unit (ESU) as Threatened on September 16, 1999. CH was designated by NMFS on January 2, 2005. EFH was designated for Pacific salmon, which includes this ESU, by NMFS on June 28, 2005. Population declines are attributed primarily to altered stream flows and blocked access to upper elevation headwaters due to dams. Spring-run Chinook salmon are thought, by some, to once have been the most abundant run of salmon in the Central Valley. This race once migrated into the headwaters of tributaries to the Sacramento and San Joaquin Rivers. They now only exist in the mainstem and a few tributaries to the Sacramento River. Central Valley spring-run Chinook salmon adult migration occurs in the Sacramento River from late March to September. The fish overwinter in coldwater habitats and then spawn from August to October with peak spawning occurring in September. Incubation occurs from mid-August to mid-March with rearing and emigration occurring from mid-August through April.

Deer Creek is one of the tributaries to the Sacramento River where spring-run Chinook salmon reproduce. The project site is located in the currently designated CH and EFH for Central Valley spring-run Chinook salmon. They are known to occur within the study area reach of Deer Creek and are also known to migrate through, and spawn upstream of the study area (M. Johnson pers. comm.). Juvenile spring-run salmon are also known to use the study area reach of Deer Creek for rearing (M. Johnson pers. comm.). Spring-run salmon were not observed during site surveys, however intensive fish surveys were not conducted. One of the purposes of the proposed project is to improve passage conditions for native fish, including Central Valley spring-run Chinook salmon. **However, potentially significant impacts could occur if Central Valley spring-run Chinook salmon were present within the study area and were harmed or killed by construction activities.**

Invertebrates

Vernal Pool Fairy Shrimp (*Branchinecta lynchi*)

The vernal pool fairy shrimp was listed as Threatened by USFWS on September 19, 1994. CH was initially designated on August 6, 2003. Additional CH was designated on February 10, 2006. Population declines are attributed to destruction and degradation of vernal pool habitats. Vernal pool fairy shrimp occur exclusively in vernal pool and vernal pool-like habitats. Although the species has been collected from larger pools, it generally tends to occur in smaller pools less than 0.05 acres and is typically found in pools with low to moderate salinity or total dissolved solids (U.S. Fish and Wildlife Service 2005). Vernal pool fairy shrimp eggs, or cysts, remain dormant in the soil when the pools are dry and several

separate hatches can occur in a single wet season. Adults can reach sexual maturity in as few as 18 days at optimal water temperatures and feed on algae, bacteria, protozoa, rotifers and detritus (U.S. Fish and Wildlife Service 2005).

A portion of the study area is located within currently designated CH for vernal pool fairy shrimp including the south access road, a small portion of the north access road and the southern portion of the construction area (U.S. Fish and Wildlife Service 2018). Vernal pool fairy shrimp were not observed during surveys, however full protocol-level surveys were not conducted. CDFW, with assistance from TES staff, conducted an assessment of potential habitat for special-status vernal pool branchiopods (fairy shrimp and tadpole shrimp) within the access roads within the study area (Eggeman 2018). Potential habitat is present in seasonal wetlands and seasonally wet depressions within the south access road. **Potentially significant impacts could occur if project construction activities harmed or killed vernal pool fairy shrimp or negatively impacted habitat for this species.**

Valley Elderberry Longhorn Beetle (*Desmocerus californicus dimorphus*)

The valley elderberry longhorn beetle (VELB) was federally listed as a Threatened species by USFWS on August 8, 1980. CH was designated by USFWS on August 8, 1980. Suggested threats to the existence of this species include loss of elderberry shrubs and associated riparian habitat, pesticide use, grazing and other mismanagement of riparian habitat. Current recovery efforts are primarily focused on revegetating riparian habitats. The VELB is endemic to the Central Valley of California. They are associated with elderberry (*Sambucus spp.*) shrubs during their entire life cycle. VELB larvae bore into and feed on the pithy core of elderberry stems for up to two years before emerging as adults after chewing an exit hole through the stem and bark. The adult beetles feed on elderberry foliage until they mate in early summer. The female then lays eggs in crevices in the bark of the elderberry plant.

The project site is not located in, or near the currently designated CH but is located within the known range of the species. Suitable habitat (elderberry shrubs with stems greater than, or equal to, one inch in diameter) exists within the study area. No exit holes were observed during surveys. A more complete analysis of this species and its potential habitat in the project site is provided in the Biological Assessment for the project (Tehama Environmental Solutions, In Press). **Potentially significant impacts could occur if project construction activities harmed or killed VELB or negatively impacted habitat for this species.**

Vernal Pool Tadpole Shrimp (*Lepidurus packardii*)

The vernal pool tadpole shrimp was listed as Endangered by USFWS on September 19, 1994. CH was initially designated on August 6, 2003. Additional CH was designated on February 10, 2006. Population declines are attributed to destruction and degradation of vernal pool habitats. Vernal pool tadpole shrimp occur in a wide variety of ephemeral habitats and have been collected in pools ranging in size from 6.5 square feet to 88 acres (U.S. Fish and Wildlife Service 2005). Vernal pool tadpole shrimp eggs, or cysts, remain dormant in the soil when the pools are dry and hatch in as few as four days after winter rains fill the vernal habitats (U.S. Fish and Wildlife Service 2005). Adults reach sexual maturity in three to four weeks and females can deposit as many as six clutches of eggs in a single wet season (U.S. Fish and Wildlife Service 2005). They feed on organic debris and living organisms such as fairy shrimp and other invertebrates (U.S. Fish and Wildlife Service 2007).

A portion of the study area is located within the currently designated CH for vernal pool tadpole shrimp including the south access road, a small portion of the north access road and the southern portion of the construction area (U.S. Fish and Wildlife Service 2018). Vernal pool tadpole shrimp were not observed within the study area during surveys, however full protocol-level surveys were not conducted. CDFW, with assistance from TES staff, conducted an assessment of potential habitat for special-status vernal pool branchiopods (fairy shrimp and tadpole shrimp) within the access roads within the study area (Eggeman

2018). Site surveys of a large vernal pool near the south access road, but outside of the study area, detected vernal pool tadpole shrimp. Potential habitat is present in seasonal wetlands and seasonally wet depressions within the south access road. **Potentially significant impacts could occur if project construction activities harmed or killed vernal pool tadpole shrimp or negatively impacted habitat for this species.**

Mammals

Pallid Bat (*Antrozous pallidus*)

The pallid bat is designated as a CDFW Species of Special Concern. Threats to the species include destruction and disturbance of roosting sites which include caves, crevices, mines, and occasionally, hollow trees and buildings (Zeiner et al. 1990b). This species is most common in open, dry areas near rocky sites for roosting in a wide variety of habitats including grasslands, shrublands, woodlands and forests from sea level up through mixed conifer forests (Zeiner et al. 1990b). Females give birth in the early summer in nursery colony roosts and the young are not weaned until the fall. Pallid bats feed on large arthropods including scorpions, cicadas, katydids, beetles, crickets, grasshoppers, praying mantids and moths (Bolster et al. 1998).

Pallid bats are known to occur within the study area. This species was detected within the study area during acoustical site surveys. Pallid bats may be roosting in hollow trees or crevices within, or near the study area. Pallid bats may forage within the study area if roosting habitat is located in the general vicinity, however impacts to foraging activities would typically not be considered significant due to the fact that foraging habitat is not limited regionally, the temporary nature of the project construction activities and the fact that this species typically forages at night when construction activities would not normally occur. **Potentially significant impacts could occur if active pallid bat roosts were disturbed as a result of project construction activities.**

Ringtail (*Bassariscus astutus*)

The ringtail is designated as a Fully Protected species under the California Fish and Game Code. Threats to the species include urbanization and loss and degradation of riparian communities (Williams 1986). This medium-sized carnivore inhabits forests and shrublands in close association with riparian habitats or rocky areas. They are usually found within 0.6 miles of permanent water (Zeiner et al. 1990b) in low to middle elevations. Ringtails den and nest in hollow trees, snags, cavities in rocks, abandoned burrows and human structures. Ringtail primarily feed on rodents and rabbits and also birds and eggs, reptiles, invertebrates, fruits, nuts and some carrion.

There is a potential for ringtails to be denning in riparian habitats within the study area. No ringtails were observed during site surveys, however they are seldom observed without the use of specialized survey methods due to their strongly nocturnal nature. This species is likely to forage within the site, however impacts to foraging activities would typically not be considered significant due to the fact that foraging habitat is not limited regionally, the temporary nature of the project construction activities and the fact that this species typically forages at night when construction activities would not normally occur. **Potentially significant impacts could occur if ringtails were denning or nesting within the project area and were harmed or killed during project construction activities.**

Townsend's Big-eared Bat (*Corynorhinus townsendii*)

The Townsend's big-eared bat is listed as a CDFW Special Species of Concern. The main threat to this species is loss of roosting sites due to human disturbance, mine closure and renewed mining in abandoned mines. Townsend's big-eared bats occur in a variety of habitats but are more common in mesic sites (Williams 1986). Roosting sites include caves, lava tubes, mine tunnels and large hollow trees, as well as other human-made structures such as buildings, bridges and water diversion tunnels. Roosting sites are

extremely sensitive to human disturbance and can be abandoned due to a single human visit (Zeiner et al. 1990b), however in some instances this species can become habituated to reoccurring and predictable human activity (California Department of Fish and Wildlife 2013). Females give birth from May to July in nursery colony roosts and the young are generally weaned by August. Townsend's big-eared bats feed primarily on large moths but also take small numbers of other insects (Bolster et al. 1998).

Townsend's big-eared bats would not be expected to roost within the study area due to a lack of preferred roosting habitat. This species was not detected within the study area during acoustical site surveys however, they are difficult to detect acoustically. Townsend's big-eared bats may forage within the study area if roosting habitat is located in the general vicinity, however impacts to foraging activities would typically not be considered significant due to the fact that foraging habitat is not limited regionally, the temporary nature of the project construction activities and the fact that this species typically forages at night when construction activities would not normally occur. **No significant impacts to the Townsend's big-eared bat are anticipated from the proposed project.**

Spotted Bat (*Euderma maculatum*)

The spotted bat is a CDFW Species of Special Concern. This species is considered one of the rarest mammals in North America but the reasons for population declines are not well documented (Zeiner et al. 1990b). The spotted bat is a solitary species and forages late at night, principally for moths. They roost in rock crevices, cliffs, caves and buildings with cliffs providing optimal habitat. The spotted bat forages over water and along washes (Zeiner et al. 1990b). Occupied habitats range from arid deserts and grasslands to mixed conifer forests (Zeiner et al. 1990b).

Spotted bats would not be expected to roost within the study area to a lack of suitable roosting habitat (rock crevices, cliffs, caves and buildings with cave-like crevices). Spotted bats were not detected during acoustical site surveys. Spotted bats may forage within the study area if roosting habitat is located in the general vicinity, however impacts to foraging activities would typically not be considered significant due to the fact that foraging habitat is not limited regionally, the temporary nature of the project construction activities and the fact that this species typically forages at night when construction activities would not normally occur. **No significant impacts to the spotted bat are anticipated from the proposed project.**

Western Mastiff Bat (*Eumops perotis*)

The western mastiff bat is a CDFW Species of Special Concern. Reasons for decline of this species are attributed to extensive loss of habitat, cultivation of foraging habitat and use of insecticides (Williams 1986). The species is non-migratory and day-roosts alone or in small colonies in crevices in rock outcrops, cliffs, trees and tall buildings. Nursery roosts as described as tight rock crevices approximately three feet deep and two inches wide or crevices in buildings. They occupy semi-arid to arid habitats including conifer and deciduous woodlands, coastal scrub, grasslands and chaparral (Zeiner et al. 1990b). Night roosts are seldom used due to their prolonged foraging period. They feed primarily on hymenopteran insects (Zeiner et al. 1990b). When roosting in rock crevices, western mastiff bats need vertical faces to drop off from to take flight.

Western mastiff bats would not be expected to roost within the study area due to a lack of suitable roosting habitat (rock crevices, cliffs, caves, tunnels and high buildings with cave-like crevices). Western mastiff bats were not detected during acoustical site surveys. Western mastiff bats may forage within the study area if roosting habitat is located in the general vicinity, however impacts to foraging activities would typically not be considered significant due to the fact that foraging habitat is not limited regionally, the temporary nature of the project construction activities and the fact that this species typically forages at night when construction activities would not normally occur. **No significant impacts to the western mastiff bat are anticipated from the proposed project.**

Western Red Bat (*Lasiurus blossevillii*)

The western red bat is designated as a CDFW Species of Special Concern. Potential threats to this species include loss of riparian habitat from habitat conversions and fatalities from wind turbines. Their roosting habitat includes forests and woodlands, ranging from sea level to mixed conifer forests. They roost in foliage near edge habitats adjacent to streams, fields or urban areas in trees (Zeiner et. al. 1990b). The western red bat hibernates in the winter and is generally considered a solitary species. They feed over a wide variety of habitats including grasslands, shrublands, open woodlands and forests, and croplands. They are nocturnal and feed primarily on insects such as moths, crickets, beetles and cicadas. Breeding occurs in August and September and, after delayed fertilization, females give birth between late May and early July.

Western red bats may use suitable habitat (riparian forest) within or near the project site for roosting or foraging. Potential roosting habitat is present in riparian habitats within the study area. This species was not detected within the study area during acoustical site surveys. Impacts to western red bats could occur if a maternal roost was located in vegetation impacted by project activities. Western red bats may forage within the study area if roosting habitat is located in the general vicinity, however impacts to foraging activities would typically not be considered significant due to the fact that foraging habitat is not limited regionally, the temporary nature of the project construction activities and the fact that this species typically forages at night when construction activities would not normally occur. **Potentially significant impacts could occur if western red bat maternity roosts were disturbed as a result of project vegetation clearing.**

Natural Communities

Several riparian habitats identified as CNDDDB rare communities including the Great Valley Cottonwood Riparian Forest, Great Valley Valley Oak Riparian Forest, Great Valley Mixed Riparian Forest and Great Valley Willow Scrub may be temporarily impacted by the project through construction activities. All disturbed areas will be revegetated after construction is complete.

Several instream habitats identified as CNDDDB rare communities including the Central Valley Drainage Fall-run Chinook Stream, the Central Valley Drainage Hardhead / Squawfish Stream and the Central Valley Drainage Spring-run Chinook Stream may be temporarily impacted by the project. Impacted instream habitats will be restored to preconstruction functions and values following project completion. These instream habitats will be positively affected by the improvements to fish passage conditions, which will enable native fish to better access upstream and downstream habitats.

A wetland delineation was conducted (Tehama Environmental Solutions 2018) within the study area which identified and mapped several wetlands and other aquatic features that may be jurisdictional under Sections 404 and 401 of the Clean Water Act and / or Section 1600 of the California Fish and Game Code. Potential impacts to these potentially jurisdictional features will be addressed during the regulatory permit / authorization processes.

CONCLUSIONS AND RECOMMENDED AVOIDANCE AND MINIMIZATION MEASURES

Listed and Candidate Species

Based on the results found in Appendix B, 12 federally and / or state listed or candidate animal species have the potential to occur within the study area, including the foothill yellow-legged frog, tricolored blackbird, Swainson's hawk, western yellow-billed cuckoo, little willow flycatcher, American bald eagle, bank swallow, Central Valley steelhead, Central Valley spring-run Chinook salmon, vernal pool fairy

shrimp, valley elderberry longhorn beetle and vernal pool tadpole shrimp.

Of these 12 species, eight may be potentially significantly impacted by the project including the foothill yellow-legged frog, Swainson's hawk, American bald eagle, Central Valley steelhead, Central Valley spring-run Chinook salmon, vernal pool fairy shrimp, valley elderberry longhorn beetle and the vernal pool tadpole shrimp. Recommended avoidance and minimization measures are provided for these eight species below.

Foothill Yellow-legged Frog

- ❖ Within ten (10) calendar days prior to work in aquatic habitats, water bodies shall be surveyed by a qualified biologist to determine if any foothill yellow-legged frogs are present. If any foothill yellow-legged frogs are found, a qualified and permitted biologist shall determine and implement appropriate relocation procedures, in coordination with CDFW. The site shall be checked daily by trained construction workers prior to work commencing, including underneath vehicles and equipment that will be used. If foothill yellow-legged frogs are found, they will be moved by a qualified and permitted biologist to an area of safety out of harm's way.

Swainson's Hawk and American Bald Eagle

Potentially significant impacts could occur if Swainson's hawks or American bald eagles were nesting within, or near the study area and were impacted by project construction activities. The following measures are recommended in order to avoid potentially significant impacts of the proposed project on these species:

- ❖ Any tree removal, vegetation clearing, or the onset of potentially disturbing construction activities should occur between September 1 and January 1 (outside of the nesting season for raptors with potential to occur within, or in the vicinity of the project site).
- ❖ If tree removal, vegetation clearing, or the onset of potentially disturbing construction activities must occur during the nesting season, a raptor nesting survey of the construction area and adjacent suitable habitat should be conducted by a qualified biologist no more than ten days prior to the initiation of the onset of these activities or as appropriate survey protocols require. If active raptor nests are found to be present, tree removal, vegetation clearing and the onset of potentially disturbing construction activities should be suspended until a qualified biologist, in consultation with CDFW and / or USFWS can establish an appropriate protective buffer area to minimize impacts to the nesting raptors. No construction activities should commence within the buffer area until the qualified biologist determines that the young birds have fledged or the nest is no longer active.
- ❖ Construction activities shall occur continuously (not including weekends) until the end of the nesting season to discourage avian species from initiating nesting. If construction activities cease for more than seven (7) consecutive days (including weekends), all construction activities shall cease until CDFW can be consulted to determine if a subsequent nesting bird survey must be performed.

Central Valley Steelhead and Central Valley Spring-run Chinook Salmon

- ❖ All Reasonable and Prudent Measures and Terms and Conditions found in the Programmatic Biological Opinion issued by NMFS for the project (NMFS 2016) will be adhered to.
- ❖ Instream work can occur between July 1st and September 30th. Instream work could start sooner if CDFW determines that the adult CV spring-run Chinook salmon are no longer present based on

environmental conditions and real time passage data. Instream work could be extended October 14th, if environmental conditions which would preclude juvenile steelhead and spring-run Chinook salmon emigration or adult steelhead and late-fall-run Chinook salmon immigration are expected to persist. Instream work outside of the July 1st to September 30th work window must be approved by CDFW and NMFS on a case-by-case basis with details on how take will be avoided and / or minimized.

- ❖ For work within the channel and banks, fish rescue efforts (herding fish, netting, and seining) will be required prior to the onset of any dewatering of the area. This will be coordinated with CDFW.
- ❖ All construction debris (concrete, metal, etc.) from the fish passage improvement-related construction activities shall be removed from the active stream channel post-construction.
- ❖ Immediately prior to installation of temporary dam structures, a qualified fish biologist, in coordination with CDFW, will conduct snorkel surveys above and below the dam and diversion, to identify presence of salmonids. USFWS, in coordination with the contractor, and in consultation with NMFS and CDFW, will ensure that qualified fish biologists are onsite to implement fish rescue operations within the dewatered area through the use of herding, seining and / or electrofishing, if necessary. Best professional determination will be used to decide which method(s) of rescue is to be used and where the relocation of captured fish, either upstream or downstream of the temporary dams is to occur. Biologists will first try to haze and herd fish out of the fish exclusion area. If fish biologists determine that the use of electrofishing is necessary for the efficient and successful removal of fish, NMFS electrofishing guidelines will be strictly followed. The fish rescue team will be comprised of fishery biologists with professional experience using seines and electrofishing equipment. The same methodologies will be used during dewatering of the diversion ditch.
- ❖ Adequate erosion and pollution control measures shall be taken to ensure that sediment, turbidity, petroleum products or other harmful chemicals do not enter Deer Creek as a result of construction activities. Standard Best Management Practices (BMPs) shall be incorporated into the project designs.
- ❖ BMPs will be developed and implemented to ensure that wet concrete does not enter Deer Creek during construction.
- ❖ All pumps used during construction shall be screened to meet CDFW and NMFS criteria, unless deemed unnecessary by CDFW and NMFS (i.e. if water was being diverted from an off-channel pool).
- ❖ For the duration of the project, all diverted water must be screened through the existing screens, which currently do not meet CDFW and NMFS criteria, however best professional judgement will be used to prevent harm to juvenile fish through frequent monitoring and site specific modifications as needed. Furthermore, all water returned to the stream will comply with NMFS bypass return criteria, including consideration of the location of the bypass pipe exit (i.e. bypassed water will enter the watercourse and will not be of an excessive height, or empty onto rocks, etc.) for the duration of the bypass period.
- ❖ The refueling of pumps will occur away from the wetted area / channel. If pumps are using fuel, they will be outfitted with a spill kit.

- ❖ All dewatering and re-watering activities will be conducted slowly, in order to minimize disturbance to fish. A qualified fisheries biologist will be onsite during these activities, and CDFW will be notified prior to these activities.

Valley Longhorn Elderberry Beetle

- ❖ To reduce potential impacts to VELB to less than significant levels, the proposed project should comply with the current USFWS *Framework for Assessing Impacts to the Valley Elderberry Longhorn Beetle (Desmocerus californicus dimorphus)* (U.S. Fish and Wildlife Service 2017).

Vernal Pool Fairy Shrimp and Vernal Pool Tadpole Shrimp

- ❖ The USFWS should be consulted to 1) develop appropriate avoidance and minimization measures, and 2) determine whether an Endangered Species Act Section 7 take permit will be required for the project.
- ❖ Project activities should avoid impacts to vernal pools, seasonal wetlands or other large branchiopod (fairy shrimp, tadpole shrimp) habitats, to the extent possible.
- ❖ High-visibility fencing should be installed in areas where equipment will be working near any large branchiopod (fairy shrimp, tadpole shrimp) habitat that is not to be disturbed.
- ❖ No road grading or road improvements should be allowed in or near large branchiopod habitats that are not to be disturbed.
- ❖ All transporters of potentially hazardous materials (fuel, oil, cement, etc.) will be notified as to the presence of potential large branchiopod habitats and be required to inspect their vehicles prior to entry and exit of these areas, to prevent accidental discharge.
- ❖ All vehicular traffic will be restricted to stay within the designated work boundaries. The work boundaries will be flagged or fenced and identified on construction drawings to limit equipment and personnel to the minimum area necessary to perform the project work and minimize impacts to wetland habitat.

Species of Special Concern, Fully Protected Species and Other Protected Species

A total of 17 additional species designated by CDFW as Species of Special Concern or Fully Protected could potentially be significantly impacted by the proposed project. In addition, potentially significant impacts could occur to other species protected under the Migratory Bird Treaty Act and several sections of the California Fish and Game Code. Recommended avoidance and minimization measures are provided for these 17 species below.

Western Pond Turtle

- ❖ Within ten (10) calendar prior to work in aquatic habitats, areas that will be disturbed within 100 feet of water bodies shall be surveyed by a qualified biologist to determine if any western pond turtles or turtle nests are present. If any turtles or turtle nests are found, a qualified and permitted biologist shall determine and implement appropriate relocation procedures, in coordination with CDFW. The site shall be checked daily by trained construction workers prior to work commencing, including underneath vehicles and equipment that will be used. If turtles are found, they will be moved by a qualified and permitted biologist to an area of safety out of harm's way.

Long-eared Owl, Northern Harrier, American Peregrine Falcon and White-tailed Kite

- ❖ The avoidance and minimization measures identified for Swainson's hawk and American bald eagle will adequately mitigate for any potential impacts to the long-eared owl, burrowing owl, northern harrier, American peregrine falcon and white-tailed kite.

Burrowing Owl

- ❖ Within ten (10) calendar days prior to the onset of potentially disturbing construction activities, a burrowing owl nesting / roosting survey of the construction area and adjacent suitable habitat should be conducted by a qualified biologist. If active burrowing owl burrows are found to be present, the onset of potentially disturbing construction activities should be suspended until a qualified biologist, in consultation with CDFW, can establish an appropriate protective buffer area to minimize impacts to the nesting / roosting birds. No construction activities should commence within the buffer area until the qualified biologist determines that the young birds have fledged or the burrow is no longer active.

Grasshopper Sparrow, Yellow-breasted Chat, Loggerhead Shrike and Yellow Warbler

- ❖ Any tree removal, vegetation clearing, or the onset of potentially disturbing construction activities should occur between August 1 and March 1 (outside of the nesting season for these species). Note: Also see measure for Swainson's hawk and American bald eagle.
- ❖ If tree removal, vegetation clearing, or the onset of potentially disturbing construction activities must occur during the nesting season, a nesting survey of the construction area and adjacent suitable habitat should be conducted by a qualified biologist no more than ten (10) calendar days prior to the initiation of the onset of these activities. If active migratory bird nests are found to be present, tree removal, vegetation clearing and the onset of potentially disturbing construction activities should be suspended until a qualified biologist, in consultation with CDFW, can establish an appropriate protective buffer area to minimize impacts to the nesting birds. No construction activities should commence within the buffer area until the qualified biologist determines that the young birds have fledged or the nest is no longer active.
- ❖ Construction activities shall occur continuously (not including weekends) until the end of the nesting season to discourage avian species from initiating nesting. If construction activities cease for more than seven (7) consecutive days (including weekends), all construction activities shall cease until CDFW can be consulted to determine if a subsequent nesting bird survey must be performed.

Other Nesting Raptors

- ❖ The avoidance and minimization measures identified for Swainson's hawk and American bald eagle will adequately mitigate for any potential impacts to other nesting raptors. Nests are not to be disturbed or removed as a result of construction activities per CDFW.

Other Nesting Migratory Birds

- ❖ The avoidance and minimization measures identified for grasshopper sparrow, yellow breasted chat, loggerhead shrike and yellow warbler will adequately mitigate for any potential impacts to other nesting migratory birds.

Riffle Sculpin, Hardhead and Fall- / Late Fall-run Chinook Salmon

- ❖ The avoidance and minimization measures identified for Central Valley steelhead and Central Valley spring-run Chinook salmon will adequately mitigate for any potential impacts to the riffle sculpin, hardhead and Central Valley fall- / late fall-run Chinook salmon.

Pacific Lamprey

- ❖ All reasonable measures will be taken to minimize impacts to lamprey, including spending more time at the area as it becomes dewatered (and they are moving out of the mud, chasing the water as it recedes), and possibly electroshocking.

Pallid Bat

- ❖ Prior to any vegetation removal, a survey of the vegetation to be removed shall be conducted by a qualified biologist to ensure that pallid bats are not roosting in the vegetation to be removed.
- ❖ If pallid bats are found to be roosting within the vegetation to be removed, vegetation removal shall be suspended until a qualified biologist, in consultation with CDFW, can establish appropriate measures to minimize impacts to this species.

Ringtail

- ❖ Potential ringtail denning habitat exists within the project in the form of hollow trees. Prior to construction, a biologist will inspect potential denning sites for signs of denning.
- ❖ If ringtail are found to be denning, construction activities will be suspended until a qualified biologist, in consultation with CDFW, can establish appropriate measures to protect ringtail.

Western Red Bat

- ❖ All vegetation clearing within potential western red bat roosting habitat (woody riparian habitat), shall occur between August 31 and May 1, in order to minimize the likelihood of injuring or killing juvenile bats during the period when they are still unable to fly.

Natural Communities

The following avoidance and minimization measures are recommended in order to avoid potentially significant impacts of the proposed project on rare natural communities:

Great Valley Cottonwood Riparian Forest, Great Valley Mixed Riparian Forest, Great Valley Valley Oak Riparian Forest and Great Valley Willow Scrub

- ❖ Disturbance to riparian vegetation will be avoided or minimized to the extent possible.
- ❖ A revegetation plan will be prepared in coordination with the landowner to replace impacted riparian wetlands and other disturbed vegetation by a measure of quantity and quality equal to or exceeding impacts of the project using appropriate native riparian trees and shrubs.
- ❖ Areas with woody vegetation that have been disturbed will be revegetated in accordance with the revegetation plan.

Central Valley Drainage Spring-run Chinook Stream, Central Valley Drainage Fall-run Chinook Stream and Central Valley Drainage Hardhead / Squawfish Stream

- ❖ Disturbance to instream habitats shall be avoided, where possible. If these habitats cannot be avoided, appropriate avoidance and minimization measures will need to be developed during the environmental permit processes with CDFW and other regulatory agencies.

Wetlands and Other Waters of the U.S. / State

- ❖ Because construction of the site requires that disturbance occur, and / or fill material be placed within wetlands or other waters of the U.S., a Clean Water Act Section 404 permit will likely be required from the Corps. In addition, a Clean Water Act Section 401 Certification from the

RWQCB and a Section 1600 Lake or Streambed Alteration Agreement with CDFW may also be required.

General Measures

The following avoidance and minimization measures are recommended in order to avoid potentially significant impacts of the proposed project on all special-status species and their associated habitats:

- ❖ A construction worker education program shall be implemented for all personnel onsite that includes an explanation of all special-status animal species with the potential to occur, including identification, avoidance measures, and federal and state laws that protect the species. This shall include, at a minimum, those special-status species analyzed in this document.
- ❖ Appropriate measures will be used to avoid the spread of Aquatic Invasive Species such as Zebra / Quagga mussels, New Zealand mudsnails and Chytrid Fungus to and from the project area according to the current CDFW *Aquatic Invasive Species Disinfection/Decontamination Protocols - (Northern Region)* (California Department of Fish and Wildlife 2015) and the current USFWS *Red Bluff Fish and Wildlife Office Anadromous Fish Restoration Program Hazard Analysis Critical Control Point Plan* (U.S. Fish and Wildlife Service 2015).

With incorporation of these avoidance and minimization measures, no significant impacts to state- or federally-listed animal species, special-status animal species or rare natural communities are expected to occur as a result of the proposed project. With incorporation of these avoidance and minimization measures, the project is not expected to jeopardize the continued existence of any listed species and / or is expected to have temporal impacts below a level of significance to listed species.

A “may affect, not likely to adversely affect” determination is anticipated for the western yellow-billed cuckoo, vernal pool fairy shrimp and vernal pool tadpole shrimp. An unavoidable “may affect, likely to adversely affect” determination is anticipated for VELB. This will be addressed as part of the consultation with the USFWS under Section 7 of the Endangered Species Act.

An unavoidable “may affect, likely to adversely affect” determination is anticipated for Central Valley steelhead and Central Valley Spring-run Chinook salmon. A “not likely to destroy or adversely modify” determination is anticipated for Central Valley steelhead and Central Valley spring-run Chinook salmon CH. A “not likely to eliminate or significantly diminish or disrupt” determination is anticipated for EFH for Pacific Salmon. This will be addressed as part of the consultation with NMFS under the existing Programmatic Biological Opinion issued by NMFS for the project (NMFS 2016).

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ACKNOWLEDGEMENTS

We wish to thank the Hamilton family, the Leininger family and the Gaumer family for allowing access to the DCID project site to complete our work. Funding for this work was provided by the USFWS under the authority of the Central Valley Project Improvement Act through Grant Agreement Award F18AP00096.

APPENDIX A

CNNDB Search Results

APPENDIX A
CNDDDB Records Search Results
Deer Creek DCID Fish Passage Project

COMMON NAME	SCIENTIFIC NAME	USGS 7.5' QUADRANGLE								
		TUSP	DEPE	PASP	LOMO	ACHO	ISCA	VINA	RSNW	CAMO
FAUNAL SPECIES										
Tricolored Blackbird	<i>Agelaius tricolor</i>							X		
Antioch Dunes Anthicid Beetle	<i>Anthicus antiochensis</i>				X					
Sacramento Anthicid Beetle	<i>Anthicus sacramento</i>				X			X		
Pallid Bat	<i>Antrozous pallidus</i>				X					
Great Egret	<i>Ardea alba</i>				X					
Great Blue Heron	<i>Ardea herodias</i>				X					
Conservancy Fairy Shrimp	<i>Branchinecta conservatio</i>							X	X	
Vernal Pool Fairy Shrimp	<i>Branchinecta lynchi</i>								X	
Swainson's Hawk	<i>Buteo swainsoni</i>							X		
Western Yellow-billed Cuckoo	<i>Coccyzus americanus occidentalis</i>	X			X			X		
Townsend's Big-eared Bat	<i>Corynorhinus townsendii</i>				X					
Valley Elderberry Longhorn Beetle	<i>Desmocerus californicus dimorphus</i>				X			X		
Western Pond Turtle	<i>Emys marmorata</i>		X		X	X		X		
North American Porcupine	<i>Erethizon dorsatum</i>							X		
Western Mastiff Bat	<i>Eumops perotis californicus</i>	X						X	X	
Prairie Falcon	<i>Falco mexicanus</i>		X	X		X	X			
Yellow-breasted Chat	<i>Icteria virens</i>	X			X					
Silver-haired Bat	<i>Lasionycteris noctivagans</i>							X		

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Deer Creek DCID Fish Passage Project

COMMON NAME	SCIENTIFIC NAME	USGS 7.5' QUADRANGLE								
		TUSP	DEPE	PASP	LOMO	ACHO	ISCA	VINA	RSNW	CAMO
Western Red Bat	<i>Lasiurus blossevillii</i>				X			X		
Hoary Bat	<i>Lasiurus cinereus</i>				X			X		
Vernal Pool Tadpole Shrimp	<i>Lepidurus packardi</i>							X	X	
California Linderiella	<i>Linderiella occidentalis</i>							X	X	
Long-eared Myotis	<i>Myotis evotis</i>				X					
Yuma Myotis	<i>Myotis yumanensis</i>				X					
Steelhead – Central Valley DPS	<i>Oncorhynchus mykiss irideus</i>	X	X	X	X	X	X	X	X	
Chinook Salmon - Central Valley Spring-run ESU	<i>Oncorhynchus tshawytscha</i>		X	X		X	X			
Chinook Salmon – Sacramento River Winter-run ESU	<i>Oncorhynchus tshawytscha</i>				X			X		
Osprey	<i>Pandion haliaetus</i>				X			X		
Foothill Yellow-legged Frog	<i>Rana boylei</i>		X	X	X		X			
Bank Swallow	<i>Riparia riparia</i>				X			X		
Yellow Warbler	<i>Setophaga petechia</i>	X			X					
Western Spadefoot	<i>Spea hammondi</i>								X	
Least Bell's Vireo	<i>Vireo bellii pusillus</i>				X					
NATURAL COMMUNITIES										
Central Valley Drainage Fall-Run Chinook Stream					X	X		X	X	
Central Valley Drainage Hardhead / Squawfish Stream			X	X	X	X	X	X	X	

APPENDIX A
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Deer Creek DCID Fish Passage Project

COMMON NAME	SCIENTIFIC NAME	USGS 7.5' QUADRANGLE								
		TUSP	DEPE	PASP	LOMO	ACHO	ISCA	VINA	RSNW	CAMO
Central Valley Drainage Spring-Run Chinook Stream				X		X	X			
Central Valley Drainage Valley Floor River				X				X		
Coastal and Valley Freshwater Marsh								X		
Great Valley Cottonwood Riparian Forest				X				X		
Great Valley Mixed Riparian Forest				X				X		
Great Valley Valley Oak Riparian Forest								X		
Great Valley Willow Scrub								X		
LEGEND:										
TUSP = Tuscan Springs			LOMO = Los Molinos			VINA = Vina				
DEPE = Dewitt Peak			ACHO = Acorn Hollow			RSNW = Richardson Springs NW				
PASP = Panther Spring			ISCA = Ishi Caves			CAMO = Campbell Mound				

APPENDIX B

Potentially Occurring Special-status Species

APPENDIX B
Potentially-occurring Special-status Species
Deer Creek DCID Dam Fish Passage Project

SPECIES	LISTING STATUS		TYPICAL HABITAT	POTENTIAL FOR OCCURRENCE
	Common Name (<i>Scientific Name</i>)	Federal		
AMPHIBIANS & REPTILES				
Western Pond Turtle (<i>Emys marmorata</i>)	---	CSC	In or near aquatic habitats in slow-moving water. Often associated with basking substrate (e.g. logs, large rocks, etc.) Use adjacent uplands to nest and overwinter.	Known to occur. Observed in Deer Creek within the study area during site surveys.
Foothill Yellow-legged Frog (<i>Rana boylei</i>)	---	CT / CSC	In or near rocky streams in a variety of habitats. Rarely encountered far from permanent water.	May occur. Potential breeding habitat present in Deer Creek within the study area. Known to occur approximately 15 river miles upstream of the study area (M. Johnson pers. comm. 2018, CDFW 2018a). Not observed during TES site surveys. Not observed during CDFW site surveys (P. Bratcher pers. comm.).
California Red-legged Frog (<i>Rana draytonii</i>)	T	CSC	Slow-moving or pooled aquatic habitats with overhanging vegetation.	Not likely to occur. The study area is well outside of the current known range of the species and this species is believed to have been extirpated from the Sacramento Valley (U.S. Fish and Wildlife Service 2002). Not observed during site surveys, however protocol-level surveys were not conducted.
Western Spadefoot (<i>Spea hammondi</i>)	---	CSC	Grasslands, and occasionally, valley-foothill hardwood woodlands with shallow temporary pools for breeding.	May occur. Not likely to breed within the study area due to a lack of suitable breeding habitat. Potential breeding habitat present in a large vernal pool near the study area; no larvae observed during intensive single-event large branchiopod survey (Eggeman 2018). Not observed during TES site surveys, however targeted surveys were not conducted.
Giant Garter Snake (<i>Thamnophis gigis</i>)	T	T	Highly aquatic. Primarily associated with marshes and sloughs, less with slow-moving creeks. Absent from larger rivers.	Not likely to occur. The study area is well outside of the current known range of the species and this species. Not observed during site surveys.

APPENDIX B
Potentially-occurring Special-status Species
Deer Creek DCID Dam Fish Passage Project

SPECIES	LISTING STATUS		TYPICAL HABITAT	POTENTIAL FOR OCCURRENCE
	Common Name (Scientific Name)	Federal		
BIRDS				
Tricolored Blackbird (<i>Agelaius tricolor</i>)	---	CE / CSC	Breeds colonially in tall emergent vegetation or sometimes in tall, upland herbaceous vegetation in areas large enough to support approximately 50 pairs. Forages in grasslands and agricultural lands.	May occur. Observed in the general vicinity of the study area during site surveys. Not likely to nest within the study area, due to a lack of suitable nesting habitat of sufficient size. May forage within the study area if nesting in the general area.
Grasshopper Sparrow (<i>Ammodramus savannarum</i>)	---	CSC	Uses short- to mid-height moderately open grasslands with scattered shrubs and tall forbs. Ground nesting in depressions near the base of overhanging grass or forb clumps.	May occur. Potential nesting and foraging habitat present adjacent to the access haul routes. Not observed during site surveys.
Golden Eagle (<i>Aquila chrysaetos</i>)	---	FP	Uses rolling foothills and mountain terrain, wide arid plateaus deeply cut by streams and canyons, open mountain slopes, and cliffs and rock outcrops. Generally inhabit more open country.	Known to occur. Observed during site surveys. Not likely to nest within the study area due to a lack of preferred nesting habitat. May forage within the study area.
Short-eared Owl (<i>Asio flammeus</i>)	---	CSC	Uses open areas with few trees including grasslands, prairies, dunes, meadows, irrigated areas and emergent wetlands. Nests in open country supporting rodents and herbaceous cover sufficient to conceal ground nests.	May occur. Not likely to nest due to the fact that the study area is well outside of the current known breeding range for the species. Potential winter foraging and roosting habitat is present within the study area. Not observed during site surveys.
Long-eared Owl (<i>Asio otus</i>)	---	CSC	Riparian, live oak or conifer thickets with small, densely canopied trees used for roosting and nesting. Generally forages in open areas.	May occur. Potential nesting and foraging habitat present within the study area. Not observed during site surveys.

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Potentially-occurring Special-status Species
Deer Creek DCID Dam Fish Passage Project

SPECIES	LISTING STATUS		TYPICAL HABITAT	POTENTIAL FOR OCCURRENCE
	Common Name (<i>Scientific Name</i>)	Federal		
Burrowing Owl (<i>Athene cunicularia</i>)	---	CSC	Uses open grasslands, deserts or scrublands. Nests in small mammal burrows, pipes, culverts or nesting boxes. Species is gregarious.	May occur. Low likelihood of nesting within the study area due to a lack of preferred nesting habitat, however potential nesting, roosting and foraging habitat for this species occurs adjacent to the study area. May forage within the study area if nesting or roosting within the general area or during the winter. Not observed during site surveys. No potential burrows observed during site surveys.
Swainson's Hawk (<i>Buteo swainsoni</i>)	---	T	Open desert, grassland or cropland containing scattered large trees, small groves or riparian woodlands. Nests in scattered trees, small groves, sparsely vegetated flatlands or in riparian woodlands.	May occur. Observed nesting in the general vicinity of the study area during site surveys. Potential nesting and foraging habitat present within the study area.
Vaux's Swift (<i>Chaetura vauxi</i>)	---	CSC	Nests in large hollow trees and snags in redwood, Douglas fir and other conifer habitats. Often nests in large colonies. Forages widely, but prefers rivers and lakes.	Known to occur. Observed during site surveys. Not likely to nest due to the fact that the study area is well outside of the known breeding range and due to a lack of suitable nesting habitat. May forage within the study area during spring and fall migration.
Northern Harrier (<i>Circus cyaneus</i>)	---	CSC	Nests and forages in a variety of open habitats such as grasslands, rangelands, agricultural lands, meadows and emergent wetlands that provide adequate vegetative cover, prey, and scattered hunting, plucking, and lookout perches such as shrubs or fence posts. Nests on the ground, mostly within patches of dense, often tall, vegetation in undisturbed areas.	Known to occur. Observed during site surveys. Potential nesting and foraging habitat present within the study area.

APPENDIX B
Potentially-occurring Special-status Species
Deer Creek DCID Dam Fish Passage Project

SPECIES	LISTING STATUS		TYPICAL HABITAT	POTENTIAL FOR OCCURRENCE
	Common Name (<i>Scientific Name</i>)	Federal		
Western Yellow-billed Cuckoo (<i>Coccyzus americanus occidentalis</i>)	T	E	Dense deciduous riparian cover, especially willow with low-level understory foliage, near slow-moving water with high humidity, utilizes riparian forests and adjacent orchards for foraging. Requires large habitat patch sizes, greater than or equal to seven acres in size for nesting.	May occur. Not likely to nest within the study area due to lack of minimum nesting habitat acreage requirements. May forage within the study area if nesting within the general area. Historic records of potential nesting in the lower 0.5 mile reach of Deer Creek near the Sacramento River, approximately ten river miles downstream of the study area (CDFW 2018a). Not observed during site surveys.
Black Swift (<i>Cypseloides niger</i>)	---	CSC	Breeds in small colonies on cliffs behind or adjacent to waterfalls in deep canyons and sea-bluffs above surf. Forages widely.	May occur. Not likely to nest due to the fact that the study area is well outside of the known breeding range and due to a lack of suitable nesting habitat. May forage within the study area during spring and fall migration. Not observed during site surveys.
White-tailed Kite (<i>Elanus leucurus</i>)	---	FP	Nests in dense tree stands near open foraging areas. Forages in open grassland and agricultural areas.	May occur. Potential nesting and foraging habitat present within the study area. Not observed during site surveys.
Little Willow Flycatcher (<i>Empidonax traillii brewsteri</i>)	---	E	Nests in upper elevation riparian and wet meadow habitats.	Known to occur. Observed during site surveys. Not likely to nest due to the fact that the study area is outside of the known breeding range. May forage within the study area during spring and fall migration.
American Peregrine Falcon (<i>Falco peregrinus anatum</i>)	D	D / FP	Riparian areas, coastal and inland wetlands are important habitats. Breeds mostly in woodland, forest and coastal habitats on cliff ledges, occasionally in snag cavities and in other used raptor nests.	Known to occur. Observed during site surveys. Potential nesting habitat present in the vicinity of the study area on high voltage power line towers. May forage within the project area if nesting within the general area or during the winter.

APPENDIX B
Potentially-occurring Special-status Species
Deer Creek DCID Dam Fish Passage Project

SPECIES	LISTING STATUS		TYPICAL HABITAT	POTENTIAL FOR OCCURRENCE
	Common Name (Scientific Name)	Federal		
Bald Eagle (<i>Haliaeetus leucocephalus</i>)	D	E / FP	Nests in large trees with open branchwork, usually near permanent water including rivers, streams and lakes / reservoirs. Forages over large bodies of water with abundant fish.	Known to occur. Observed during site surveys. Potential nesting and foraging habitat present within the study area. Low likelihood of nesting within the study area due the lack of existing nests. May forage within the study area if nesting in the general area.
Yellow-breasted Chat (<i>Icteria virens</i>)	---	CSC	Nests in dense shrubs along streams and rivers.	Known to occur. Observed during site surveys. Potential nesting and foraging habitat present within the study area.
Loggerhead Shrike (<i>Lanius ludovicianus</i>)	---	CSC	Prefers open habitats with scattered trees, shrubs, posts, fences and other perches. Found primarily in valley-foothill and desert habitats.	Known to occur. Observed during site surveys. Potential nesting and foraging habitat present within the study area.
American White Pelican (<i>Pelecanus erythrorhynchos</i>)		CSC	Rests in day and roosts at night along edge of water, on beaches, sandbars, or old driftwood, but never in trees. Nests at large freshwater and saltwater lakes, usually on small islands or remote dikes.	May occur. Observed flying at high elevations over the project site during site surveys. Not likely to nest due to the fact that the study area is well outside of the known breeding range and due to a lack of suitable nesting habitat. Marginal foraging habitat present within the study area.
Bank Swallow (<i>Riparia riparia</i>)	---	T	Nests in excavated burrows in fine-textured vertical stream banks.	May occur. Not likely to nest within the study area due to a lack of suitable nesting habitat. May forage within the study area if nesting in the general area. Known to nest along Deer Creek approximately eight miles downstream of the study area (Bratcher 2018). Not observed during site surveys.
Yellow Warbler (<i>Setophaga petechia</i>)	---	CSC	Nests in riparian habitats, montane chaparral and open conifer forests with substantial amounts of brush.	May occur. Potential nesting and foraging habitat present within the study area. Not observed during site surveys.

APPENDIX B
Potentially-occurring Special-status Species
Deer Creek DCID Dam Fish Passage Project

SPECIES	LISTING STATUS		TYPICAL HABITAT	POTENTIAL FOR OCCURRENCE
	Common Name (<i>Scientific Name</i>)	Federal		
Least Bell's Vireo (<i>Vireo bellii pusillus</i>)	E	E	Nests in understory vegetation in dense willow-dominated riparian habitats with well-developed understory. High and low shrub layers are used for foraging. Usually nests in willows but may also use wild rose and coast live oak.	Not likely to occur. The study area is well outside the current known range of the species. Not observed during site surveys.
FISH				
Green Sturgeon (Southern DPS) (<i>Acipenser medirostris</i>)	T / SC	CSC	Requires cool freshwater for spawning in large cobble. Spawning takes place in deep, fast water.	Not likely to occur. Study area lacks suitable spawning habitat. Juvenile rearing likely precluded due to diversion dam downstream of the study area. Not known to occur within the study area reach of Deer Creek (M. Johnson pers. comm.). Not observed during TES site surveys, however intensive fish surveys were not conducted.
Riffle Sculpin (<i>Cottus gulosus</i>)	---	CSC	Found exclusively in permanent coldwater streams where riffles and rocky substrates predominate. Prefer shallow fast-flowing waters.	Known to occur. Has been observed within the study area reach of Deer Creek (M. Johnson pers. comm.). Not observed during TES site surveys, however intensive fish surveys were not conducted.
Pacific Lamprey (<i>Entosphenus tridentatus</i>)	---	CSC	Occupies habitat downstream of impassable dams in Sacramento River tributaries primarily on the valley floor and foothills. Adults spawn in gravelly riffles in river tributary streams. Ammocoetes (young) use soft stream sediments.	Known to occur. Spawning adults observed in Deer Creek within the study area during TES site surveys. Adults also observed within the study area during CDFW foothill yellow-legged frog surveys (P. Bratcher pers. comm.).
Delta Smelt (<i>Hypomesus transpacificus</i>)	T	E	Uses estuaries and the freshwater edge of the mixing zone at the saltwater-freshwater interface.	Not likely to occur. The study area is well outside the current known range of the species. Not observed during site surveys.

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Potentially-occurring Special-status Species
Deer Creek DCID Dam Fish Passage Project

SPECIES	LISTING STATUS		TYPICAL HABITAT	POTENTIAL FOR OCCURRENCE
	Common Name (Scientific Name)	Federal		
River Lamprey (<i>Lampetra ayresi</i>)	---	CSC	Adults spawn in gravelly riffles in river tributary streams. Ammocoetes (young) use silty backwaters and eddies.	Not likely to occur. Known to occur in the Sacramento River but is rarely observed in tributaries, and only near the river (R.J. Bottario pers. comm.). Not well studied in Deer Creek. Not observed during site surveys, however intensive fish surveys were not conducted.
Hardhead (<i>Mylopharodon conocephalus</i>)	---	CSC	Low to mid-elevation streams up to 4,900 feet in elevation in the Sacramento drainage. Also present in the San Joaquin River and Russian River. Clear, deep pools with sand, gravel, and boulder substrate. Slow water velocity. Not found where exotic centrarchids predominate.	Known to occur. Has been observed within the study area reach of Deer Creek (M. Johnson pers. comm.). Not observed during site surveys, however intensive fish surveys were not conducted.
Central Valley Steelhead (<i>Oncorhynchus mykiss</i>)	T	---	Spawns in cool, clear water with clean spawning gravel in the Sacramento River and many tributaries.	Known to occur. Adults are known to migrate through, and spawn in Deer Creek, upstream of the study area, and juveniles are known to rear in the study area (M. Johnson pers. comm.). Rainbow trout / steelhead were observed during TES site surveys. Juvenile salmonids were observed during TES site surveys, however they were not identified to species and intensive fish surveys were not conducted.
Central Valley Fall- / Late Fall-run Chinook Salmon (<i>Oncorhynchus tshawytscha</i>)	SC	CSC	Spawns in cool, clear water with clean spawning gravel in the Sacramento River and many tributaries.	Known to occur. Adults are known to spawn in Deer Creek, within the study area (M. Johnson pers. comm.). Juveniles are known to rear in the study area (M. Johnson pers. comm.). Juvenile salmonids were observed during TES site surveys, however they were not identified to species and intensive fish surveys were not conducted.

APPENDIX B
Potentially-occurring Special-status Species
Deer Creek DCID Dam Fish Passage Project

SPECIES	LISTING STATUS		TYPICAL HABITAT	POTENTIAL FOR OCCURRENCE
	Common Name (Scientific Name)	Federal		
Central Valley Spring-run Chinook Salmon (<i>Oncorhynchus tshawytscha</i>)	T	T	Spawns in the late summer / early fall in cool, clear water with clean spawning gravel in the Sacramento River and some tributaries.	Known to occur. Adults are known to migrate through and spawn in Deer Creek, upstream of the study area and juveniles rear in the study area (M. Johnson pers. comm.). Juvenile salmonids were observed during TES site surveys, however they were not identified to species and intensive fish surveys were not conducted.
Sacramento River Winter-run Chinook Salmon (<i>Oncorhynchus tshawytscha</i>)	E	E	Spawns in the summer in cool, clear water with clean spawning gravel, almost exclusively in the main-stem of the Sacramento River.	Not likely to occur. Not known to use Deer Creek for spawning (M. Johnson pers. comm.). Non-natal rearing may occur in the lower reaches of Deer Creek, however juveniles are not likely to pass the Stanford Vina diversion, located downstream of the study area (M. Johnson pers. comm.). Juvenile salmonids were observed during TES site surveys, however they were not identified to species and intensive fish surveys were not conducted.
INVERTEBRATES				
Conservancy Fairy Shrimp (<i>Branchinecta conservatio</i>)	E	---	Vernal pool and vernal pool-like habitats. Tends to be associated with large, turbid vernal pool and vernal playas.	Not likely to occur. The study area lacks preferred habitat in the form of large vernal pools. Not observed during site surveys, however protocol-level surveys were not conducted.
Vernal Pool Fairy Shrimp (<i>Branchinecta lynchi</i>)	T	---	Vernal pool and vernal pool-like habitats.	May occur. Potential habitat is present in seasonal wetlands adjacent to, and within the south access haul road (Eggeman 2018). Not observed during site surveys, however protocol-level surveys were not conducted.

APPENDIX B
Potentially-occurring Special-status Species
Deer Creek DCID Dam Fish Passage Project

SPECIES	LISTING STATUS		TYPICAL HABITAT	POTENTIAL FOR OCCURRENCE
	Common Name (<i>Scientific Name</i>)	Federal		
Valley Elderberry Longhorn Beetle (<i>Desmocerus californicus dimorphus</i>)	T	---	Elderberry shrubs with stems 1 inch or greater in diameter.	May occur. Potential habitat is present within the study area. Not observed during site surveys. No exit holes observed in elderberry shrubs during site surveys.
Vernal Pool Tadpole Shrimp (<i>Lepidurus packardii</i>)	E	---	Vernal pool and ephemeral wetland habitats.	May occur. Potential habitat is present in seasonal wetlands adjacent to, and within the south access haul road (Eggeman 2018). Known to occur in a large vernal pool near the south access haul route (Eggeman 2018). Not observed within the study area during site surveys, however protocol-level surveys were not conducted.
MAMMALS				
Pallid Bat (<i>Antrozous pallidus</i>)	---	CSC	Uses a wide variety of habitats including grassland, shrubland, woodland and forest. Roosts in caves, mines, crevices, hollow trees and buildings.	Known to occur. Detected within the study area during acoustical site surveys. Potential roosting and foraging habitat present within the study area.
Ringtail (<i>Bassariscus astutus</i>)	---	FP	Riparian habitats and forest and shrub habitats near rocky areas or riparian areas from low to middle elevations.	May occur. Potential denning and foraging habitat present within the study area. Not observed during site surveys.

APPENDIX B
Potentially-occurring Special-status Species
Deer Creek DCID Dam Fish Passage Project

SPECIES	LISTING STATUS		TYPICAL HABITAT	POTENTIAL FOR OCCURRENCE
	Common Name (<i>Scientific Name</i>)	Federal		
Gray Wolf (<i>Canis lupis</i>)	E	E	Uses a variety of habitats including temperate forests, mountains, tundra, taiga and grasslands.	Low likelihood of occurrence. Potential denning and foraging habitat present within the study area, however there is an extremely low likelihood of occurrence due to the very low density of wolves in California and the extremely large territory wolves occupy. Several detections of one adult migrating through the general area have been recorded in eastern Tehama County in 2011, 2012 and 2013 (CDFW 2018c). Not observed during site surveys.
Townsend's Big-eared Bat (<i>Corynorhinus townsendii</i>)	---	CSC	Roosts in caves, mines, tunnels, buildings and rarely in large hollow trees. Very sensitive to human disturbance; however, in some instances it can become habituated to reoccurring and predictable human activity.	May occur. Not likely to roost within the study area due to a lack of preferred roosting habitat. May forage within the study area if roosting in the general vicinity. Not detected during acoustical site surveys, however this species is difficult to detect acoustically.
Spotted Bat (<i>Euderma maculatum</i>)	---	CSC	Prefers to roost in rock crevices on cliffs but occasionally roosts in caves and buildings. Forages over water in a variety of habitats.	May occur. Not likely to roost within the study area due to a lack of suitable roosting habitat. May forage in the study area if roosting in the general vicinity. Not detected during acoustical site surveys.
Western Mastiff Bat (<i>Eumops perotis</i>)	---	CSC	Roosts in crevices in cliff faces, high buildings, trees and tunnels. Occurs in open arid to semi-arid habitats with abundant roost sites.	May occur. Not likely to roost within the study area due to a lack of suitable roosting habitat. May forage in the study area if roosting in the general vicinity. Not detected during acoustical site surveys.
Western Red Bat (<i>Lasiurus blossevillii</i>)	---	CSC	Roosts primarily in trees, less often in shrubs. Roost sites often are in edge habitats adjacent to streams, fields, or urban areas. Prefers edges or habitat mosaics that have trees for roosting and open areas for foraging.	May occur. Potential roosting and foraging habitat present within the study area. Not detected during acoustical site surveys.

APPENDIX B
Potentially-occurring Special-status Species
Deer Creek DCID Dam Fish Passage Project

SPECIES	LISTING STATUS		TYPICAL HABITAT	POTENTIAL FOR OCCURRENCE
Common Name (<i>Scientific Name</i>)	Federal	State		

LEGEND:

- | | |
|---|---|
| <p>E Endangered
 T Threatened
 CE Candidate for listing as Endangered
 CT Candidate for listing as Threatened
 PE Proposed for listing as Endangered
 PT Proposed for listing as Threatened</p> | <p>D Delisted
 PD Proposed for Delisting
 CSC California Species of Special Concern
 FP California Fully Protected
 SC NMFS Species of Concern</p> |
|---|---|

APPENDIX C

Faunal Species Observed Within or Near the Study Area

APPENDIX C
Faunal Species Observed Within or Near the Project Site
Deer Creek DCID Fish Passage Project

COMMON NAME	SCIENTIFIC NAME	LISTING STATUS	
		Federal	State
AMPHIBIANS & REPTILES			
Bullfrog*	<i>Rana catesbeiana</i>		
Common King Snake	<i>Lampropeltis getula</i>		
Gopher Snake	<i>Pituophis melanoleucus</i>		
Mountain Garter Snake	<i>Thamnophis elegans elegans</i>		
Pacific Chorus Frog	<i>Pseudacris regilla</i>		
Southern Alligator Lizard	<i>Gerrhonotus multicarinatus</i>		
Western Fence Lizard	<i>Sceloporus occidentalis</i>		
Western Pond Turtle	<i>Emys marmorata</i>		CSC
Western Rattlesnake	<i>Crotalus viridis</i>		
Western Toad (eggs)	<i>Bufo boreas</i>		
Western Whiptail	<i>Aspidoscelis tigris</i>		
BIRDS			
Acorn Woodpecker	<i>Melanerpes formicivorus</i>		
American Bald Eagle	<i>Haliaeetus leucocephalus</i>	D	E / FP
American Crow	<i>Corvus brachyrhynchos</i>		
American Kestrel	<i>Falco sparverius</i>		
American Peregrine Falcon	<i>Falco peregrinus anatum</i>	D	D / FP
American Robin	<i>Turdus migratorius</i>		
American White Pelican	<i>Pelecanus erythrorhynchos</i>		CSC
Anna's Hummingbird	<i>Calypte anna</i>		
Ash-throated Flycatcher	<i>Myiarchus cinerascens</i>		
Barn Swallow	<i>Hirundo rustica</i>		
Belted Kingfisher	<i>Ceryle alcyon</i>		
Bewick's Wren	<i>Thryomanes bewickii</i>		
Black Phoebe	<i>Sayornis nigricans</i>		
Black-headed Grosbeak	<i>Pheucticus melanocephalus</i>		
Brewer's Blackbird	<i>Euphagus cyanocephalus</i>		
Brown-headed Cowbird	<i>Molothrus ater</i>		
Bullock's Oriole	<i>Icterus bullockii</i>		
Bushtit	<i>Psaltriparus minimus</i>		
California Horned Lark	<i>Eremophila alpestris actia</i>		
California Quail	<i>Callipepla californica</i>		
Canada Goose	<i>Branta canadensis</i>		
Cinnamon Teal	<i>Anas cyanoptera</i>		
Common Merganser	<i>Mergus merganser</i>		
Common Raven	<i>Corvus corax</i>		
Cooper's Hawk	<i>Accipiter cooperii</i>		
Dark-eyed Junco	<i>Junco hyemalis</i>		
Downy Woodpecker	<i>Picoides pubescens</i>		
Eurasian Collared-Dove*	<i>Streptopelia decaocto</i>		
European Starling*	<i>Sturnus vulgaris</i>		
Ferruginous Hawk	<i>Buteo regalis</i>		
Golden Eagle	<i>Aquila chrysaetos</i>		FP
Golden-crowned Sparrow	<i>Zonotrichia atricapilla</i>		

APPENDIX C
Faunal Species Observed Within or Near the Project Site
Deer Creek DCID Fish Passage Project

COMMON NAME	SCIENTIFIC NAME	LISTING STATUS	
		Federal	State
Great Blue Heron	<i>Ardea herodias</i>		
Great Egret	<i>Casmerodius albus</i>		
Greater Yellowlegs	<i>Tringa melanoleuca</i>		
Great-tailed Grackle	<i>Quiscalus mexicanus</i>		
House Finch	<i>Carpodacus mexicanus</i>		
House Sparrow*	<i>Passer domesticus</i>		
House Wren	<i>Troglodytes aedon</i>		
Killdeer	<i>Charadrius vociferous</i>		
Lark Sparrow	<i>Chondestes grammacus</i>		
Lesser Goldfinch	<i>Spinus psaltria</i>		
Lewis's Woodpecker	<i>Melanerpes lewis</i>		
Little Willow Flycatcher	<i>Empidonax traillii brewsteri</i>		E
Loggerhead Shrike	<i>Lanius ludovicianus</i>		CSC
Mallard	<i>Anas platyrhynchos</i>		
Mourning Dove	<i>Zenaida macroura</i>		
Northern Flicker	<i>Colaptes auratus</i>		
Northern Harrier	<i>Circus cyaneus</i>		CSC
Northern Mockingbird	<i>Mimus polyglottos</i>		
Nuttall's Woodpecker	<i>Picoides nuttallii</i>		
Oak Titmouse	<i>Parus inornatus</i>		
Osprey	<i>Pandion haliaetus</i>		
Phainopepla	<i>Phainopepla nitens</i>		
Red-shouldered Hawk	<i>Buteo lineatus</i>		
Red-tailed Hawk	<i>Buteo jamaicensis</i>		
Red-winged Blackbird	<i>Agelaius phoeniceus</i>		
Rock Dove*	<i>Columba livia</i>		
Rough-legged Hawk	<i>Buteo lagopus</i>		
Ruby-crowned Kinglet	<i>Regulus calendula</i>		
Savannah Sparrow	<i>Passerculus sandwichensis</i>		
Say's Phoebe	<i>Sayornis saya</i>		
Snow Goose	<i>Chen caerulescens</i>		
Spotted Sandpiper	<i>Actitis macularia</i>		
Swainson's Hawk	<i>Buteo swainsoni</i>		T
Townsend's Solitaire	<i>Myadestes townsendi</i>		
Tricolored Blackbird	<i>Agelaius tricolor</i>		CE / CSC
Turkey Vulture	<i>Cathartes aura</i>		
Vaux's Swift	<i>Chaetura vauxi</i>		CSC
Western Bluebird	<i>Sialia mexicana</i>		
Western Kingbird	<i>Tyrannus verticalis</i>		
Western Meadowlark	<i>Sturnella neglecta</i>		
Western Scrub-Jay	<i>Aphelocoma californica</i>		
Western Tanager	<i>Piranga ludoviciana</i>		
Western Wood-Pewee	<i>Contopus sordidulus</i>		
White-breasted Nuthatch	<i>Sitta carolinensis</i>		
White-crowned Sparrow	<i>Zonotrichia leucophrys</i>		
Wild Turkey*	<i>Meleagris gallopavo</i>		

APPENDIX C
Faunal Species Observed Within or Near the Project Site
Deer Creek DCID Fish Passage Project

COMMON NAME	SCIENTIFIC NAME	LISTING STATUS	
		Federal	State
Wilson's Warbler	<i>Cardellina pusilla</i>		
Wood Duck	<i>Aix sponsa</i>		
Yellow-breasted Chat	<i>Icteria virens</i>		CSC
Yellow-rumped Warbler	<i>Dendroica coronata</i>		
FISH			
Pacific Lamprey	<i>Entosphenus tridentatus</i>		CSC
unknown Juvenile Salmonid	<i>Oncorhynchus sp.</i>		
Rainbow Trout / Steelhead	<i>Oncorhynchus mykiss</i>	T	
INVERTEBRATES			
unknown Crayfish*	<i>Unknown species</i>		
Vernal Pool Tadpole Shrimp	<i>Lepidurus packardii</i>	E	
MAMMALS			
Big Brown Bat	<i>Eptesicus fuscus</i>		
Black-tailed Jackrabbit	<i>Lepus californicus</i>		
Brazilian Free-tailed Bat	<i>Tadarida brasiliensis</i>		
California Bat	<i>Myotis californicus</i>		
California Ground Squirrel	<i>Spermophilus beecheyi</i>		
Canyon Bat	<i>Parastrellus hesperus</i>		
Coyote	<i>Canis latrans</i>		
Hoary Bat	<i>Lasiurus cinereus</i>		
Pallid Bat	<i>Antrozous pallidus</i>		CSC
Raccoon (tracks)	<i>Procyon lotor</i>		
unknown Vole	<i>Microtus sp.</i>		
Western Gray Squirrel	<i>Sciurus griseus</i>		
Yuma Bat	<i>Myotis yumanensis</i>		
LEGEND:			
E = Endangered		CSC = California Species of Special Concern	
T = Threatened		FP = California Fully Protected	
CE = Candidate for listing as Endangered		SC = NMFS Species of Concern	
CT = Candidate for listing as Threatened		D = Delisted	
PE = Proposed for listing as Endangered		PD = Proposed for Delisting	
PT = Proposed for listing as Threatened		* = Non-native Species	

APPENDIX D

Site Photos



Photo 1. View of Deer Creek with Valley Foothill Riparian habitat on the left, Riverine in the center, and Annual Grassland among the rocky outcropping on the right, looking northeast. Photo date: May 11, 2018.



Photo 2. View of DCID Dam with Valley Foothill Riparian, and Annual Grassland habitats in the background, looking south. Photo date: May 9, 2018.



Photo 3. View of Deer Creek with Barren habitat in the foreground, Riverine along the creek, and Annual Grassland with sporadic Blue Oak Woodland in the background, looking south. Photo date: May 11, 2018.



Photo 4. View of an inundated side channel with surrounding Valley Foothill Riparian habitat, looking east. Photo date: May 9, 2018.



Photo 5. View of the irrigation ditch and Valley Foothill Riparian habitat along the banks, looking west. Photo date: May 11, 2018.



Photo 6. View of Annual Grassland habitat along the study area access road, looking east. Photo date: May 9, 2018.