Biological Resources Evaluation

Mill Creek Fish Passage Restoration Project

Tehama County, California

March 2015

Prepared for:

nhc
northwest hydraulic consultants

3950 Industrial Boulevard, Suite 100C
West Sacramento, CA 95691

Prepared by:

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INTRODUCTION

Tehama Environmental Solutions, Inc. (TES) conducted this Biological Resources Evaluation (BRE) for Northwest Hydraulic Consultants (NHC) for the proposed Mill Creek Fish Passage Restoration 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 2014).

Proposed Project

The purpose of the proposed project is to improve passage for anadromous fish in Lower Mill Creek. The project includes three sites: the Exposed Siphon, Ward Dam and Upper Dam (project sites). The modifications of these features will improve upstream and downstream fish passage conditions for native fish species.

The project is being implemented by the U.S. Fish and Wildlife Service (USFWS) in cooperation with the private landowners and the Mill Creek Fish Passage Improvement Project Technical Advisory Committee (TAC), which includes representatives from USFWS, U.S. Bureau of Reclamation (Reclamation), National Marine Fisheries Service (NMFS), California Department of Fish and Wildlife (CDFW), formerly the California Department of Fish and Game (CDFG), California Department of Water Resources (DWR), Mill Creek Conservancy, Los Molinos Mutual Water Company (LMMWC), multiple private landowners and several private consulting firms.

Exposed Siphon

The Exposed Siphon portion of the project includes removal of the existing underground pipe and concrete cap, which was exposed during a large flood event and is now approximately two feet higher in elevation than the channel bed elevation. It will be replaced with a new pipe and cap, buried below the 100-year minimum scour elevation. The Exposed Siphon replacement will be accomplished with significant dewatering of the site. A newly aligned and graded low flow channel will be constructed and a series of spaced boulder clusters will be placed instream to create more favorable passage conditions during extreme low flow conditions. The north floodplain perpendicular to the Exposed Siphon pipe will be excavated, reconstructed and regraded to connect with existing elevations upstream and downstream of the excavation area. Once the instream grading is complete, the north floodplain will be replanted according to a revegetation plan. The south stream bank will also be reconstructed and restored via replanting.

Ward Dam

The Ward Dam portion of the project includes replacement and upgrade of the existing fish ladder and diversion infrastructure to provide native fish upstream and downstream passage over a larger range of flows. The fish ladder will be replaced, the existing on-canal fish screen will be augmented to improve approach and sweeping flows, the bypass return pipe will be replaced and relocated, the intake head gate will be relocated upstream and a rock scour apron will be installed downstream of the Ward Dam.

Upper Dam

The Upper Dam portion of the project includes replacement and upgrade of the existing fish ladder and diversion infrastructure to provide native fish upstream and downstream passage over a larger range of flows. The fish ladder will be replaced, the existing on-canal fish screen will be augmented to improve approach and sweeping flows, the bypass return pipe will be replaced and relocated and the intake head

gate will be relocated upstream. Additionally, a portion of the canal from the intake headgates downstream will be piped.

Study Area Location

The proposed project is located at three separate sites on Mill Creek, at approximately River Miles 1.9 (Exposed Siphon), 2.6 (Ward Dam), and 5.0 (Upper Dam), upstream of the confluence with the Sacramento River, east of Los Molinos, Tehama County, California (Figure 1). Specifically, the study area for the Exposed Siphon is located in Section 1, Township 25 North, Range 2 West Mount Diablo Base and Meridian (MDBM), the Ward Dam is located in Section 3, Township 25 North, Range 2 West MDBM and the Upper Dam is located in Section 1, Township 25 North, Range 2 West MDBM and Sections 35 and 36, Township 26 North, Range 2 West MDBM, within the 7.5-minute USGS Los Molinos quadrangle map (Figure 2).

ENVIRONMENTAL SETTING

General Site Characteristics

The project is located in the Sacramento Valley portion of the Mill Creek watershed on privately owned land. The project site is comprised of terrain varying from gradually sloping to very steep, and varying aspects associated with a perennial creek which is the main drainage (Figure 3). The project site has a general western aspect and drains to the west. The Exposed Siphon is located approximately 0.5 miles upstream of the Shasta Boulevard Bridge. Ward Dam is located approximately 1.25 miles upstream of the Shasta Boulevard Bridge and approximately 4,000 feet downstream of the Upper Dam. The elevation of the Exposed Siphon is approximately 260 feet, the elevation at the Ward Dam is approximately 291 feet and the elevation of the Upper Dam is approximately 380 feet. The Exposed Siphon and Ward and Upper Dams are part of a private stream diversion system that supplies irrigation water for agricultural and residential uses through LMMWC. The structures and associated infrastructure are owned by the LMMWC.

Land Use

To the south of Mill Creek, the property is owned by the Mill Creek Ranch, a privately owned, working organic cattle ranch. To the north of Mill Creek, the 37,540-acre Dye Creek Preserve is managed by The Nature Conservancy. The Mill Creek Ranch includes several ranch houses and associated infrastructure for power and water in the general vicinity of the Exposed Siphon and Ward Dam project sites, while land adjacent to Upper Dam on the Dye Creek Preserve is mainly used for livestock grazing, recreation, research and outdoor education.

Hydrology

Mill Creek is a 60-mile-long, southwest flowing, perennial creek. Originating from the southern-facing slopes of Lassen Peak in Lassen Volcanic National Park (LVNP), Mill Creek eventually flows into the Sacramento River near the towns of Tehama and Los Molinos, California. The Mill Creek watershed includes a total area of 134 square miles, has a general western aspect and drains to the west. Several ephemeral streams are also present within the study area.

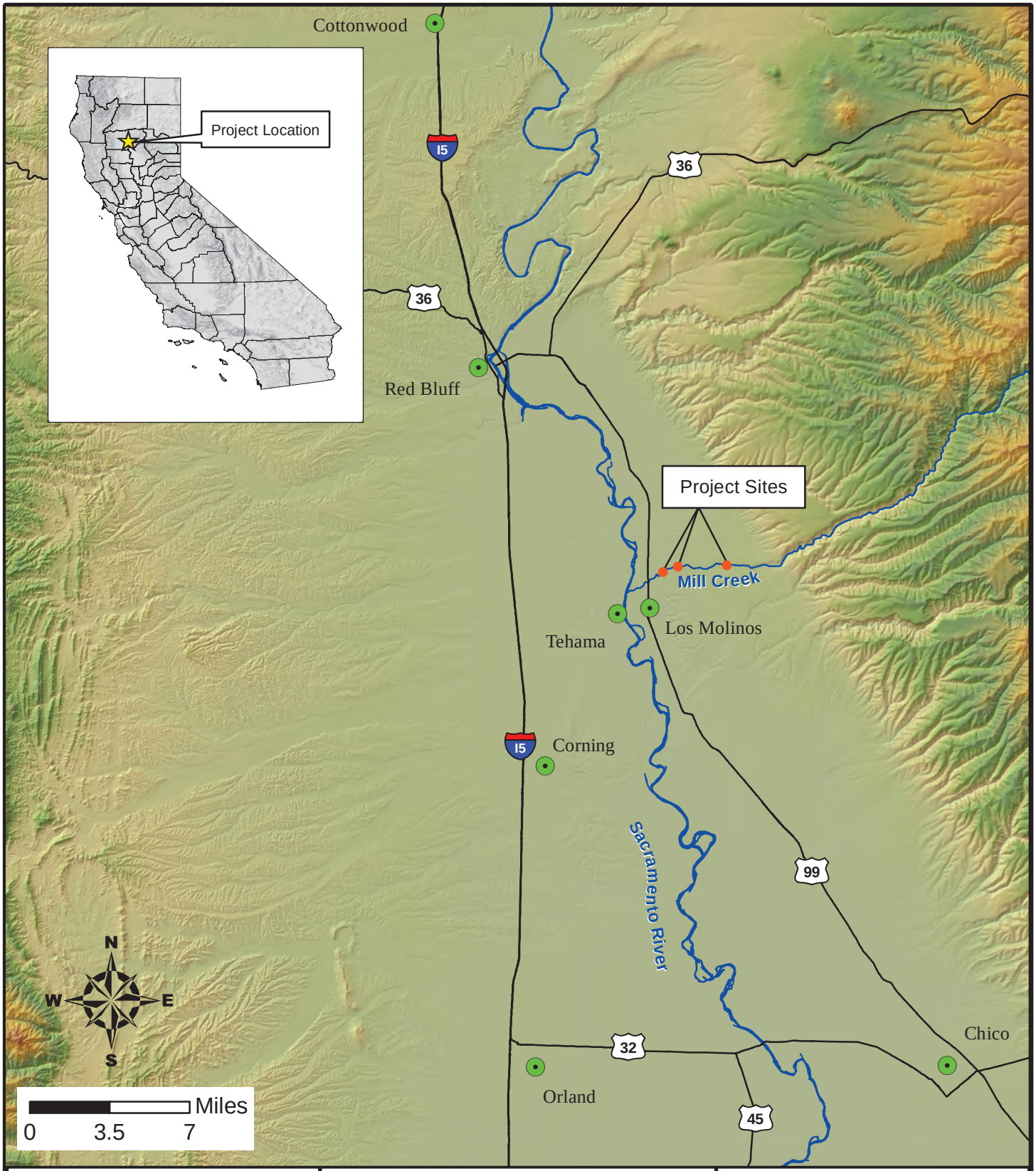

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FIGURE 1

Site Vicinity Map

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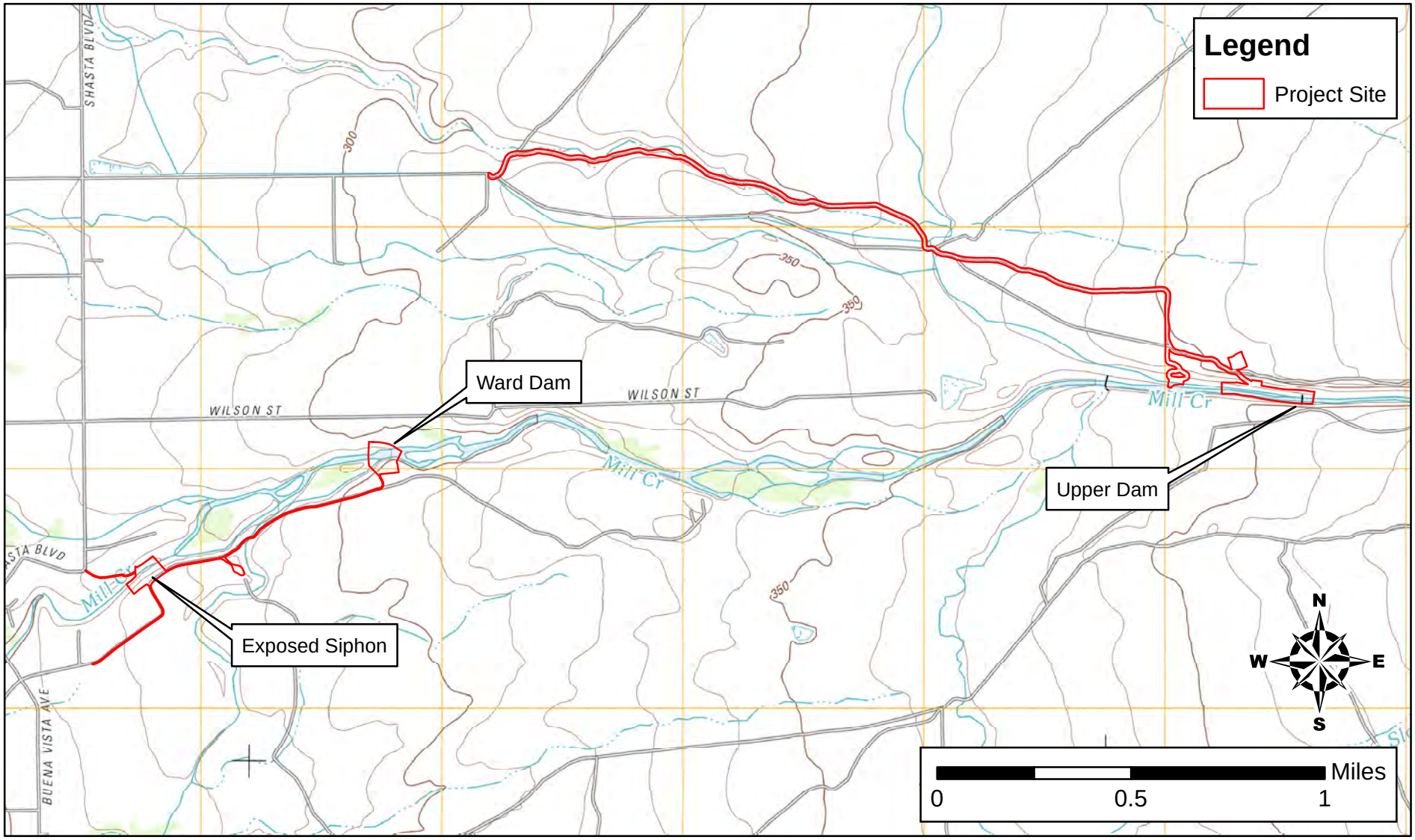

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FIGURE 2

Site Location Map

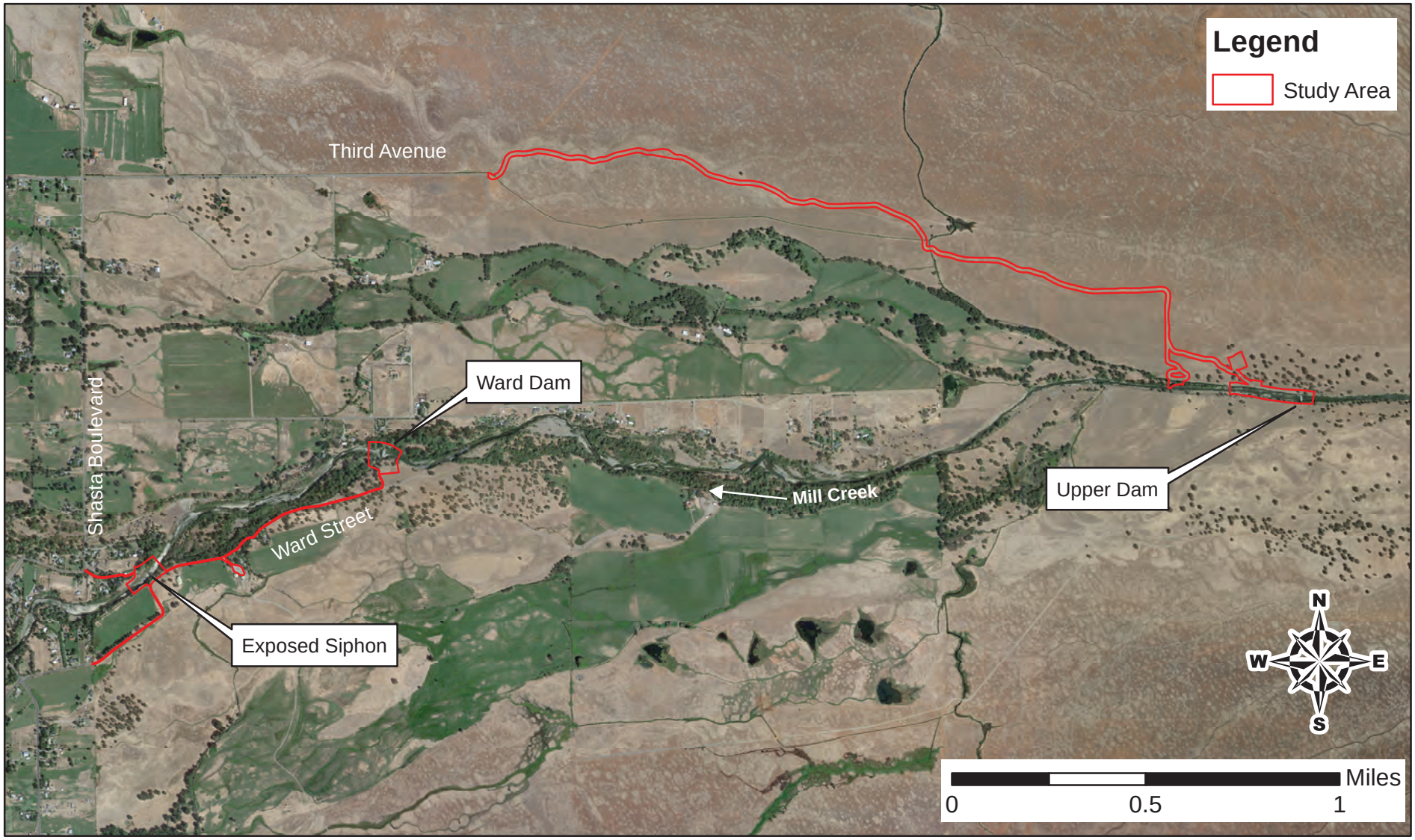

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FIGURE 3

Site Aerial Photo

PHOTO SOURCE: Google Earth, 8/27/2013

Water diversions from Ward and Upper Dams provide customers with irrigation and stock water and typically begin in the spring and end in late fall / early winter, prior to winter floods. The Ward Dam diversion has an appropriative water right for 70 cubic feet per second (cfs). Diverted water from the Ward Dam diversion is conveyed through an open diversion canal which has a fish screen and a fish bypass return pipe. The bypass return pipe allows for fish entrapped in the canal to return to Mill Creek. Diverted water that is passed through the screen is conveyed through a series of unlined ditches to convey irrigation and stock water to a number of LMMWC customers.

The Upper Dam diversion has an appropriative water right for 100 cfs. Diverted water from the Upper Dam diversion is conveyed through an open diversion canal which has a fish screen and a fish bypass return pipe. A bypass return pipe allows for fish entrapped in the canal to return to Mill Creek. Diverted water that is passed through the screen is conveyed through a series of unlined ditches to convey irrigation and stock water to a number of LMMWC customers.

Soils

Nine 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 nine identified map units are listed below:

Berrendos clay loam, 0 to 3 percent slopes
These soils are located east of the Sacramento River on narrow floodplains and are formed in alluvium, derived from basic volcanic rock. These soils are usually six feet deep, but in some areas there is a cemented layer at approximately three feet. This soil is moderately well-drained and permeability and runoff are slow. According to the California Soil Resource Lab (CSRL) website (UC Davis 2015), the taxonomy of the series is fine, montmorillonitic, thermic, Chromic Pelloxerents.

Inks cobbly loam, 3 to 30 percent slopes
This soil is located on low rounded hills east of the Sacramento River and is formed of sediments washed from areas of volcanic rocks which are mostly andesite and basalt. The soil is well-drained and permeability is moderate through the profile, but is slow through the underlying material. Runoff is slow to medium. According to the USDA-NRCS Official Soil Series Descriptions website (USDA-NRCS 2015), the taxonomy of the series is loamy-skeletal, mixed, superactive, thermic, Lithic Argixerolls.

Keefers loam, 0 to 3 percent slopes
This soil map unit is located on the eastern side of the Sacramento River on old stream terraces. They are formed on old alluvium, derived from basic igneous rock, mainly andesite and basalt. Roots and water are restricted due to the clay subsoil. The soil is well-drained with slow runoff and permeability. According to the USDA-NRCS Official Soil Series Descriptions website (USDA-NRCS 2015), the taxonomy of the series is clayey-skeletal, smectitic, thermic, Mollic Haploxeralfs.

Molinos complex, channeled (Mzt)
These soils are located along active streams east of the Sacramento River between 200 and 1,000 feet in elevation. The soils are from recent alluvium which is derived from basic igneous rocks, mainly andesite and basalt. This nearly level complex consists of well-drained to somewhat excessively drained soils. This complex can consist of any of the Molinos soils. According to the CSRL website (US Davis 2015), the taxonomy of the series is coarse-loamy, mixed, nonacid, thermic, Aquic Xerofluvents.

Molinos gravelly fine sandy loam
These soils are located along active streams east of the Sacramento River between 200 and 1,000 feet in elevation. The soils are from recent alluvium which is derived from basic igneous rocks, mainly andesite and basalt. Molinos fine sandy loam is well-drained to excessively drained. Runoff is very slow and permeability is moderately rapid. According to the CSRL website (UC Davis 2015), the taxonomy of the series is, coarse-loamy, mixed, nonacid, thermic, Typic Xerorthents.

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.

Tehama loam, 3 to 8 percent slopes
These soils are located along the edges of terraces, mostly west of the Sacramento River in elevations ranging from 200 to 1,000 feet. Tehama loam is formed in mixed alluvium, chiefly from sedimentary rock. These soils are well-drained. According to the USDA-NRCS Official Soil Series Descriptions website (USDA-NRCS 2015), the taxonomy of series is fine-silty, mixed, superactive, thermic, Typic Haploxeralfs.

Tuscan cobbly loam, 1 to 5 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 subsoil is underlain by an inundated there is a hardpan located at 10 to 20 inches in depth. The soil is well-drained and permeability is very slow. Runoff is slow. According to the USDA-NRCS Official Soil Series Descriptions website (USDA-NRCS 2015), the taxonomy of series is clayey, smectitic, thermic, shallow Typic Durixeralfs.

Vina loam, 0 to 3 percent slopes
This soil is found east of the Sacramento River from 200 to 1,000 feet in elevation and was formed from recent alluvium washed from areas of volcanic rock. This soil is well-drained and permeability is moderate. Runoff is very slow. According to the USDA-NRCS Official Soil Series Descriptions website (USDA-NRCS 2015), the taxonomy of the series is coarse-loamy, mixed, superactive, thermic, Pachic Haploxerolls.

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, Riverine and Fresh Emergent Wetland habitats.

Valley foothill riparian habitat is present along the banks of Mill Creek at the Exposed Siphon, Ward Dam and the Upper Dam. In some reaches of the creek, the riparian habitat is scattered and discontinuous, while in other areas, such as immediately upstream of the diversion dams and Exposed Siphon, it exists as a corridor on one or both banks.

At the Exposed Siphon, valley foothill riparian habitat occurs on both banks upstream and downstream of the siphon; however, it is patchy and less dense downstream of the siphon on the north bank of the creek. The dominant woody plant species at the Exposed Siphon site are white alder (*Alnus rhombifolia*), Fremont cottonwood (*Populus fremontii*), valley oak (*Quercus lobata*) and California sycamore (*Platanus racemosa*) with several other species including narrow-leaved willow (*Salix exigua),* red willow (*Salix laevigata*), mulefat (*Baccharis salicifolia*), fig (*Ficus carica*), California grape (*Vitis californica*), arroyo

willow (*Salix lasiolepis*), California blackberry (*Rubus ursinus*) and Himalayan blackberry (*Rubus armeniacus*). Blue elderberry *(Sambucus mexicana)* shrubs are also found on the south bank downstream of the Exposed Siphon. The herbaceous layer includes native species such as deer grass (*Muhlenbergia rigens*), horsetail *(Equisetum sp.)* and mugwort (*Artemisia douglasiana*) along with other native and non-native grasses and forbs.

At the Ward Dam, valley foothill riparian habitat occurs on both banks upstream and downstream of the dam; however, it is patchy and less dense upstream of the Ward Dam on the south bank of the creek. The dominant woody plant species at the Ward Dam site are white alder, Fremont cottonwood, valley oak and California sycamore with several other species including Oregon ash (*Fraxinus latifolia*), California grape and arroyo willow. The herbaceous layer includes native species such as deer grass, horsetail and mugwort along with other native and non-native grasses and forbs. Scattered species throughout the site include red willow, narrow-leaved willow, mulefat, California blackberry and Himalayan blackberry.

At the Upper Dam, valley foothill riparian habitat occurs on both banks upstream and downstream of the dam; however patches of dense habitat are only found on the north bank downstream of the dam near the fish screen and upstream of the dam on the south bank of the creek. The dominant woody plant species at the Upper Dam site are white alder and arroyo willow. The herbaceous layer includes mostly non-native grasses and forbs. Scattered species throughout the site include Himalayan blackberry, mare's tail (*Hippuris vulgaris),* torrent sedge (*Carex nudata*), buckwheat (*Eriogonum sp.*), California wild grape, horsetail, California blackberry, and deer grass.

Annual grassland habitat occurs along the haul roads to access the Upper Dam project site. All vernal pools / swales within the study area have been created along the access haul road prism, due to continual road traffic and disturbance, and are devoid of vegetation. Dominant herbaceous species here include native and non-native annual grasses and forbs. A corridor along a small portion of the Upper Dam access haul road, near the dam, on the north high terrace would be classified as blue oak woodland. The woody component is entirely blue oak. Dominant herbaceous species here include non-native annual grasses and forbs, along with some natives.

Valley oak woodland habitat occurs along the upper southern bank of the Exposed Siphon and along the upper southern bank of Upper Dam. The dominant woody plant species at this location includes Valley oak, poison oak (*Toxicodendron diversilobum*), hoary coffee berry (*Frangula californica ssp. tomentella*) and buckbrush (*Ceanothus cuneatus*). Blue elderberry shrubs were also found along the south bank of the Upper Dam site.

A continuous corridor of riverine habitat occurs and is associated with Mill Creek. Fresh emergent habitat, where present, occurs in thin discontinuous bands along the creek channel margin and along the exposed barren rock, and gravel along banks of the stream. Islands in the channel support scattered woody and herbaceous species such as torrent sedge and willows *(Salix spp.).*

METHODS

California Natural Diversity Data Base Records Search

Prior to the initiation of field studies, a records search of the California Natural Diversity Data Base (CNDDB) (CDFW 2014a) 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 Los Molinos 7.5' Quadrangle, in which the project is located,

along with the eight adjoining quadrangles (Dewitt Peak, Tuscan Springs, Red Bluff East, Gerber, Corning, Acorn Hollow, Vina and Richardson Springs NW).

Based on the results of the CNDDB search (Appendix A), 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 were based on the most recent version of the CNDDB special animals list (CDFW 2014b).

Wildlife / Fisheries Survey

A biological survey was conducted on May 21 and June 30, 2014 by Mr. Jeff Souza, TES Senior Biologist and Mr. Ben Myhre, TES Associate Biologist. Additional observations were made during work conducted at the project site for other purposes in April, July, September, October and December of 2014. The study area included the entire project footprint, as well as a varying surrounding buffer area. The surveys were conducted by walking the entire study area and recording direct wildlife observations. Observations were made using the unaided eye, binoculars and identification of vocalizations. Other methods included vocal solicitations and observations of animal tracks, scat and bird feathers. Two professional game cameras (Reconyx PC900 Hyperfire Professional IR) were deployed in May 2014. Cameras were placed only at the Upper Dam site at the request of the Mill Creek Ranch land manager. No protocol-level wildlife or fisheries surveys were conducted.

In addition, to survey for bat species, two Pettersson DX-500 full spectrum, ultrasound, acoustical recording devices were deployed during the evening hours of May 9 and 10, 2014, and one unit was deployed again on May 13 and 14, 2014. 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 a total of three different locations in order to sample varying habitats. The habitats sampled included riparian / riverine, blue oak savannah and annual grassland. The sampling occurred from approximately sundown to sunrise. Once recorded, the potential bat calls were then analyzed using SonoBat™ 3.1 software to identify calls to the species level. Only those calls, for which the software was able to reach a consensus decision, were used to generate a bat species list for the survey results (Appendix C). Recording devices were placed only at the Upper Dam site at the request of the Mill Creek Ranch land manager.

Natural Communities

CDFW has recognized a number of rare, threatened, or unique natural communities that need protection. As part of the biological survey protocols, potential special-status natural communities were identified and considered during the field work.

RESULTS

California Natural Diversity Data Base Records Search

The results of the CNDDB search indicates three past recorded occurrences of special-status animal species and three rare natural communities within the study area boundary. Special-status animal species recorded within the study area include least Bell's vireo (*Vireo bellii pusillus*), Central Valley steelhead *(Oncorhynchus mykiss*) and western pond turtle (*Emys marmorata).* The natural communities occurring within the study area include the Central Valley drainage fall-run Chinook stream, Central Valley drainage valley floor river and the Central Valley drainage hardhead / squawfish stream.

A total of 20 additional special-status animal species occurrences have been documented in the larger surrounding nine USGS quadrangle search area. Of the 20 special-status animal species, 13 are state- and / or federally-listed as threatened or endangered, including the tricolored blackbird (*Agelaius tricolor),* Conservancy fairy shrimp *(Branchinecta conservatio),* vernal pool fairy shrimp *(Branchinecta lynchi),* Swainson's hawk (*Buteo swainsoni),* western yellow-billed cuckoo *(Coccyzus americanus occidentalis),* valley elderberry longhorn beetle *(Desmocerus californicus dimorphus),* vernal pool tadpole shrimp *(Lepidurus packardi),* spring-run Chinook salmon (*Oncorhynchus tshawytscha*), winter-run Chinook salmon (*Oncorhynchus tshawytscha*), and bank swallow (*Riparia riparia*). One species, the Townsend's big-eared bat *(Corynorhinus townsendii)* is a state candidate for listing as Threatened.

Six additional rare natural communities have been documented in the CNDDB within the nine USGS quadrangle search area including the Central Valley drainage spring-run Chinook stream, coastal and valley freshwater marsh, Great Valley Cottonwood Riparian Forest, Great Valley Mixed Riparian Forest, Great Valley Valley Oak Riparian Forest and the Great Valley Willow Scrub.

Wildlife / Fisheries Survey

Several special-status animal species were observed during the 2014 field surveys. A list of all faunal species observed during site surveys is included in Appendix C.

Two federally-listed species, rainbow trout / steelhead and vernal pool fairy shrimp were observed during field surveys. Five species listed as Threatened or Endangered or Candidate as Threatened by CDFW were also observed during surveys, including the tricolored blackbird, American bald eagle *(Haliaeetus leucocephalus),* little willow flycatcher *(Empidonax traillii brewsteri),* Townsend's big-eared bat and Swainson's hawk. Several CDFW listed species of special concern were also observed or detected during field surveys including foothill yellow-legged frog *(Rana boylii),* western pond turtle, American while pelican *(Pelecanus erythrorhynchos),* golden eagle *(Aquila chrysaetos),* loggerhead shrike *(Lanius ludovicianus),* northern harrier *(Circus cyaneus),* yellow-breasted chat *(Icteria virens),* pallid bat *(Antrozous pallidus)* and western red bat *(Lasiurus blossevillii).* Several raptor species were observed at, or in the vicinity of the project site, as were several medium-sized nests that could be used by a number of raptor species.

Natural Communities

Three of the nine natural communities documented by the CNDDB within the search area were recorded to occur within the study area including Central Valley drainage fall-run Chinook stream, Central Valley drainage hardhead / squawfish stream and Central Valley drainage valley floor river. The Central Valley drainage fall-run Chinook stream habitat occurrence within the study area is described in Mill Creek as being located from the Sacramento River confluence, to the mouth of the lower canyon at an elevation of 500 feet. The Central Valley drainage fall-run Chinook stream habitat occurs throughout the entire study

area. The Central Valley drainage valley floor river occurrence within the study area is described in Mill Creek as being located from the Sacramento River confluence, upstream to the lowest diversion dam (Ward Dam) at an elevation of 290 feet. The Central Valley drainage valley floor river habitat occurs at the Exposed Siphon and Ward Dam sites. The Central Valley drainage hardhead / squawfish stream occurrence within the study area is described as being located from the Upper Dam at an elevation of 400 feet, upstream to a potential barrier near "Pape Place" in Section 25, Township 27 North, Range 1 East MDBM. The Central Valley drainage hardhead / squawfish habitat only occurs at the Upper Dam. In addition to the natural communities documented by the CNDDB within the study area, the following natural communities were documented to occur within the study area based on field surveys; Great Valley Cottonwood Riparian Forest, Great Valley Valley Oak Riparian Forest and Great Valley Willow Scrub.

EVALUATION

Several species identified through the CNDDB data query and 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 (see Appendix A). 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).

The aquatic habitats within Mill Creek provide favorable breeding and overwintering habitat for this species. Adult turtles were observed during site surveys. **Potentially significant impacts could occur if western pond turtles were present within the study area and were harmed or killed by project construction activities.**

Foothill Yellow-legged Frog (*Rana boylii*)
The foothill yellow-legged frog is designated as 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).

All aquatic habitats within the project site provide potential breeding and / or foraging habitat for this species. Foothill yellow-legged frogs were observed during site surveys. **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.**

California Red-legged Frog (*Rana draytonii*)

The California red-legged frog was federally-listed as Threatened in 1996. Critical Habitat was designated in 2001 but the majority of the Critical Habitat was later vacated by Consent Decree and remanded to the U.S. Department of the Interior for a new rulemaking. Critical Habitat was again designated in 2006. This species inhabits aquatic habitats below 3,500 feet in elevation within a matrix of riparian and upland habitats for dispersal (USFWS 2002). The species is also designated as a CDFW Species of Special Concern. Breeding generally occurs from November through April in permanent to nearly permanent aquatic habitats with dense, woody or emergent herbaceous vegetation along the shorelines with deep (>2 feet) slow-moving water (Jennings and Hayes 1994). Declines in populations have been attributed to commercial overexploitation, habitat destruction by human activities and livestock grazing, and the introduction of exotic competitors such as bullfrogs (*Rana catesbeiana*) and green sunfish (*Lepomis cyanellus*) (Jennings and Hayes 1994).

Only marginal potential habitat is present in the riverine habitat of Mill Creek in a few very small, isolated backwater pockets along the banks of Mill Creek and in the ditch system. The riverine habitat of Mill Creek is cobble-bedded and does not include emergent herbaceous vegetation such as bulrushes and cattails, which is preferred by this species. Bullfrogs and non-native centrarchids are present in Mill Creek. No individuals were observed during 2014 site surveys; however, a complete set of intensive California red-legged frog surveys using established protocols have not been completed. The project site is well outside of the currently designated Critical Habitat. The project site is also well outside the current known range of the species. It is not likely that this species would occur within the project site, this species is believed to have been extirpated from the Sacramento Valley (USFWS 2002). **No significant impacts to California red-legged frog are anticipated as a result of the proposed project.**

Western Spadefoot (*Spea hammondii*)

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 (USFWS 2004). 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 (USFWS 2004).

The study area is within the northern end of the geographical distribution for this species. Potential breeding habitat is present within the study area; however, they were not detected during recent surveys in the Dye Creek Preserve (J. Shedd pers. comm. 2014). Several small inundated wetland areas within the ephemeral drainage corridor provide marginal potential breeding habitat for the western spadefoot. It is not likely that the western spadefoot will be impacted by this project if they are present, as all project work will be conducted during the summer months which occur outside of the breeding season for this species. **No significant impacts to western spadefoot are anticipated as a result of the proposed project.**

Birds

Tricolored Blackbird (*Agelaius tricolor*)
The tricolored blackbird was listed as Endangered by the State of California in 2014 under an emergency regulatory action with an effective date of December 29, 2014 - June 30, 2015. 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. Potential effects to tricolored blackbird breeding activities would also likely be minimized due to the fact that this species primarily breeds during the spring, outside of the timing of the construction period. Potential foraging habitat is present within the project site. The species was observed flying through the area during site surveys and is known to occur north of the project site in the Dye Creek Preserve. 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 temporary nature of the project construction activities. **No significant impacts to tricolored blackbird 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 it 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 provides potential nesting and foraging habitat at the Upper Dam site for this species. Grasshopper sparrows were not observed during site surveys; however, this species is known to occur north of the project site within the Dye Creek Preserve. 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 sparrow 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 though 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).

Potential nesting and foraging habitat is present within and in the vicinity of the project site for this species. Golden eagles were observed during site surveys and this species is known to nest north of the project site within the Dye Creek Preserve. There is a low likelihood that golden eagle will nest within the project site, due to the fact that no nests were observed during surveys; however, the potential for nesting cannot be discounted as new territories can be established before all construction is complete. 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 temporary nature of the project construction activities and the fact that extensive foraging habitat is available regionally. **Potentially significant impacts could occur if golden eagle were nesting within or near the study area and project construction activities caused them to abandon an active nest.**

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 range of nesting for the species. Potential winter foraging habitat may be present within the general area; however, impacts to foraging activities would not generally be considered significant, due to the temporary nature of the project construction activities and the fact that extensive foraging habitat is available regionally. The species was not observed during site surveys. **No significant impacts to short-eared owl 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, along with birds, smaller owls and other vertebrates (Zeiner et al. 1990a). Breeding occurs from early March to late July (Zeiner et al. 1990a).

Potential nesting and foraging habitat is present within the project site for this species. The 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 temporary nature of the project construction activities. **Potentially significant impacts to long-eared**

owl could occur if long-eared owl were nesting within, or near the study area and were disturbed by project construction activities.

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.

No burrowing owls were observed during site surveys and the project site is outside of the known breeding range for this species; however, recent studies at the Dye Creek Preserve indicate that this species is wintering on the preserve and may be breeding (J. Shedd pers. comm 2014). The open grasslands of the study area near the Upper Dam represent potential nesting, roosting and foraging habitat for the burrowing owl. 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 and the fact that extensive foraging habitat is available regionally. **Potentially significant impacts could occur if burrowing owl were nesting or roosting within, or 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, CDFG 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 (CDFG 2005). In California, they now nest primarily in the Central Valley and the Great Basin regions (CDFG 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 nesting and foraging habitat for the Swainson's hawk is present within the study area near the Exposed Siphon, Ward Dam and Upper Dam. A single Swainson's hawk was observed flying at high elevations during site surveys, and they are known to occur north of the project site in the Dye Creek Preserve. 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 and the fact that extensive foraging habitat is available regionally. **Potentially significant impacts could occur if Swainson's hawk were nesting within, or near the study area and were disturbed by project construction activities.**

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).

Potential nesting and foraging habitat for the northern harrier is present in the open grasslands within the study area. A northern harrier was observed during site surveys, and they are known to occur north of the project site in the Dye Creek Preserve. 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 and the fact that extensive foraging habitat is available regionally. **Potentially significant impacts could occur if northern harrier were nesting within, or near the study area and were disturbed by project construction activities.**

Western Yellow-billed Cuckoo *(Coccyzus americanus occidentalis)*
The western population of the yellow-billed cuckoo was federally-listed as Threatened by USFWS in 2014. Critical Habitat for this species was proposed on August 15, 2014 and was in the public comment period until January 12, 2015. 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). This species winters in South America and, with only approximately 50 pairs existing, are uncommon to rare summer residents in California (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. In the Sacramento Valley, this species also utilizes adjacent orchards, especially walnut. In California, most eggs are laid from mid-June to mid-July. The western yellow-billed cuckoo typically nest in sites with at least some willow, dense low-level or understory foliage, high humidity and wooded foraging spaces in excess of 325 feet in width and 38 acres in size (Laymon 1998). Nests are a delicate, open cup of twigs built on horizontal limbs of trees or shrubs at heights of 2 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 known to occur within the study area. The project site is located approximately 1.5 miles away from the currently proposed Critical Habitat designation. This species was not observed during site surveys, although protocol-level surveys were not conducted. This species is known to nest along the Sacramento River (approximately 1.5 miles from the project site). There is no nesting habitat within the project site, due to a lack of nesting habitat that meets the species' minimum size requirements. Foraging habitat is present within the riparian areas of the project site at the Exposed Siphon, Ward and Upper Dams. The species may forage within the site if nesting or roosting on the Sacramento River; however, impacts to foraging activities would not generally be considered significant, due to the temporary nature of the project construction activities. There is also a low likelihood that western yellow-billed cuckoo would be present within the study area during most of the construction period, due to the fact that this species departs to South America by late-August or early-September (Hughes 1999). **No significant impacts to western yellow-billed cuckoo are anticipated as a result of the proposed project.**

White-tailed Kite (*Elanus caeruleus*)
The white-tailed kite is designated as Fully Protected by CDFW. 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 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 foraging and nesting habitat is present within the study area. There were no white-tailed kites observed within the study area during field surveys; however, they are known to occur north of the project

site in the Dye Creek Preserve. Even if no nesting is occurring near the study area, potential impacts to foraging activity could occur; however, impacts to foraging activities would generally not be considered significant, due to the amount of available foraging habitat regionally as well the temporary nature of the project construction activities. **Potential significant impacts could occur if this species was nesting within, or near the study area and was disturbed during project construction activities.**

Little Willow Flycatcher (*Empidonax traillii brewsteri*)

The little willow flycatcher, a subspecies of 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*) (CDFG 2005). They nest in dense willow thickets in upper elevations near rivers, streams and lakes (Zeiner et al. 1990a).

The project site is well outside of the currently designated Critical Habitat. Little willow flycatchers are not likely to nest within the study area due to the fact that the low elevation project area is not within the known breeding range of the species (A. Young pers. comm. 2014). Little willow flycatchers were observed during site surveys and it is presumed that they were migrating through the area to higher elevations. Foraging is likely to occur within the study area during times when little willow flycatchers migrate through the area; however, impacts to foraging activities would generally not be considered significant, due to the temporary nature of the project construction activities. **No significant impacts to little willow flycatcher 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 yearlong, 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 adjacent to the study area associated with the high voltage power lines. This species is known to nest north of the project site on the Dye Creek Preserve. American peregrine falcons were observed during site surveys. Foraging habitat is present within the study area; however, impacts to foraging activities would generally not considered significant, due to the temporary nature of the project construction activities and the fact that extensive foraging habitat is available regionally. **No significant impacts to American peregrine falcon are anticipated as a result of the proposed project.**

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 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 (CDFG 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 (CDFG 2005).

Potential nesting habitat is present within the study area; however, there is a low likelihood that American bald eagles would nest within the study area due to the lack of established existing nests. 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 in the area 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 temporary nature of the project construction activities and the fact that extensive foraging habitat is available regionally. **Potential significant impacts could occur if this species was nesting within the vicinity of the study area and was 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).

This species was observed during site surveys and is known to occur north of the site in the Dye Creek Preserve. Potential nesting habitat is present within the riparian areas within the study area. Potential 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. **Potential significant impacts could occur if this species was nesting within the vicinity of the study area and was 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 foraging and nesting habitat is present within the study area for loggerhead shrike. Loggerhead shrikes were observed during site surveys near the entrance to the Upper Dam access haul roads. Potential 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. **Potential significant impacts could occur if loggerhead shrikes were nesting within, or near the project 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 pelican are not likely to nest within the study area due to the fact that the study area is not within the known breeding range of the species. During site surveys, this species was observed flying at high elevations. 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 temporary nature of the project construction activities. **No significant impacts to American white pelican 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 (CDFG 2005). Recovery efforts are focused on preserving habitat and restoring naturally meandering riverine ecosystems (CDFG 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.

Bank swallows are known to nest on Mill Creek near the Sacramento River confluence approximately 1.5 miles away from the closest boundary of the study area (Bratcher pers. comm 2015). However, it is unlikely that bank swallow would nest within the study area due to the lack of suitable nesting habitat (vertical stream banks with suitable soil texture for burrowing). No bank swallows were observed during site surveys. Potential 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. **No significant impacts to bank swallow 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 and near the study area along Mill Creek. No yellow warblers were observed during site surveys; however, they are known to occur north of the site in the Dye Creek Preserve. Potential 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. **Potential significant impacts could occur if yellow warbler 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 raptor species (eagles, hawks, and owls) 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 project site. 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 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. **Potentially significant impacts could occur if active migratory bird nests were destroyed during project construction activities or project construction activities caused nesting migratory birds to abandon active nests.**

FISH

Green Sturgeon (*Acipenser medirostris*)

The green sturgeon is designated as a CDFW Species of Special Concern. The green sturgeon southern Distinct Population Segment (DPS) was federally-listed as Threatened on April 7, 2006 by the NMFS. Critical Habitat was designated by NMFS on October 9, 2009. The reported principal factor in the decline of this species, is the reduction of the spawning area to a limited section of the Sacramento River. Green sturgeon utilize both freshwater and saltwater habitat and then disperse in the ocean near shore where they spend the majority of their lives. Adults return to freshwater to spawn at approximately 15 years of age, and then every two to five years thereafter (Moyle 2002). Green sturgeon spawn in the Sacramento River, up to the Red Bluff Diversion Dam and possibly up to Keswick Dam (BOR 2008). Peak spawning occurs between May and June (NMFS 2009) in temperatures between 8-14°C, in deep pools (>3 meters) in large, high velocity main stem water (BOR 2008), likely in large cobble. Juveniles remain in the Sacramento River rearing one to two months before outmigration occurs (BOR 2008), using spawning and migratory routes as rearing habitat. In a 2008 survey, green sturgeon were observed at the mouths of Sacramento River tributaries; however, there were no green sturgeon of any life stage found in any tributaries (NMFS 2009). Juveniles rear in fresh and estuarine waters from one to four years before directed downstream movement begins in the fall, likely for migration to wintering habitats (NMFS 2009). Juvenile green sturgeon prefer temperatures of 15-16°C, with an upper limit of 19°C (NMFS 2009). Green sturgeon are benthic eaters and may also eat small fish.

The study area is located approximately two miles upstream of the Sacramento River, the Critical Habitat designation boundary. Green sturgeon are known to spawn in the main stem of the Sacramento River; however, they would not likely spawn within the study area due to lack of suitable spawning habitat (fast flowing deep water). Non-natal juvenile rearing within the study is unlikely as the results of recent studies indicate an absence of juveniles using habitat in lower tributaries to the Sacramento River. In addition, project construction work will occur during the summer / fall season when low flow and elevated water temperature conditions are likely. **No significant impacts to green sturgeon are anticipated as a result of the proposed project.**

River Lamprey *(Lampetra ayresii)*

The river lamprey is designated as a CDFW Species of Special Concern. It is reported that the populations are likely decreasing due to the decline of suitable spawning and rearing habitat in the lower reaches of larger rivers (Moyle 2002). This species has become uncommon in California, recorded only in the lower Sacramento, San Joaquin and Russian Rivers. The biology of river lampreys has not been studied in California so information is based on studies from British Columbia where the timing of events in the life history may not be the same as in California. In the three-to-five-year ammocoete (juvenile) stage, river lamprey require sandy backwaters or stream edges in which to bury themselves, where water quality is continuously high and temperatures do not exceed 25°C. In the final stages of metamorphosis, river lamprey out-migrate through freshwater, congregate immediately upstream from saltwater and enter the ocean in late spring (Moyle 2002). Adults spend three to four months in saltwater, where they grow rapidly and then migrate back into freshwater in the fall to spawn in tributaries from February to May. Adults dig saucer-shaped depressions in gravelly riffles and die after spawning. In the ammocoete stage, river lampreys feed on algae and microorganisms and in the adult stage prey on a variety of fishes.

River lamprey is not well studied in Mill Creek and current survey methods are insufficient for determining their presence. This species may be present within the study area in the ammocoete stage, and may spawn within the study area. They were not observed during site surveys; however, intensive fish surveys were not conducted. The purpose of the proposed project is to improve passage conditions for native fish. **However, potentially significant impacts could occur if river lamprey were present within the study area and were harmed or killed by project construction activities.**

Hardhead (*Mylopharadon 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. 1995). 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. 1995). In the Sacramento River system, they are widely distributed in most of the larger tributaries as well as the river.

Hardhead are known to occur in Mill Creek from the confluence of Mill Creek and the Sacramento River to above the Upper Dam site (M. Johnson pers. comm. 2014). The purpose of the proposed project is to improve passage conditions for native fish, including 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 Evolutionarily Significant Unit (ESU) was listed as Threatened by NMFS on May 18, 1998 and February 6, 2006. Critical Habitat 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 only 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 project site is located in the currently designated Critical Habitat for Central Valley steelhead. They are not known to spawn near the project site; however, they are known to migrate and emigrate through

the study area. Juvenile steelhead have been observed near the Exposed Siphon, Ward and Upper Dams in summer months and are present above Upper Dam year-round (M. Johnson pers. comm. 2015). Rainbow trout / Central Valley steelhead were observed during site surveys. The purpose of the proposed project is to improve passage condition for native 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 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.

Central Valley fall- / late fall-run Chinook salmon are known to occur in Mill Creek from the confluence with the Sacramento River to above the Upper Dam site (M. Johnson pers. comm. 2014). Central Valley fall-run Chinook salmon were observed during site surveys. The purpose of the proposed project is to improve passage conditions for native fish, including Central Valley fall- / late fall-run Chinook salmon. **However, potentially significant impacts could occur if Central Valley fall-run and 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 ESU as Threatened on September 16, 1999. Critical Habitat 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 streamflows 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 oversummer in cold-water 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.

The project site is located in the currently designated Critical Habitat for Central Valley spring-run Chinook salmon. They are not known to spawn near the study area; however, they are known to migrate and emigrate through the study area (USFS 1999). Juvenile Chinook salmon have been observed near the Exposed Siphon, Ward and Upper Dams in summer months and are present above Upper Dam year-round (M. Johnson pers. comm. 2015). These juvenile Chinook in the lower sections of Mill Creek in the summer months would more likely be spring-run than fall-run because spring-run juveniles commonly express a “stream-type” life-history, where juveniles spend one to two years in freshwater before migrating to the ocean whereas juvenile fall-run Chinook tend to express a more “ocean-type” life history

(spending little time in freshwater after emergence from the gravel before migrating downstream towards the ocean (M. Johnson pers. comm. 2015).

The purpose 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.**

Sacramento River Winter-run Chinook Salmon (*Oncorhynchus tshawytscha*)
The Sacramento River winter-run Chinook salmon was listed as Endangered by the State of California on September 22, 1989. NMFS listed the Sacramento River winter-run Chinook salmon ESU as Endangered on February 3, 1994. Critical Habitat was designated by NMFS on March 23, 1999. EFH was designated by NMFS on June 28, 2005. Population declines are attributed primarily to blocked access of historic spawning habitat from the construction of Shasta Dam. Sacramento River winter-run Chinook salmon adult migration occurs in the Sacramento River from late November through early August. Spawning occurs from late April through mid-August peaking in May and June. Fry emergence occurs from mid-June through mid-October. Emigration past Red Bluff generally peaks in September but is highly dependent on streamflow conditions.

At the closest boundary, the study area is located approximately two miles upstream of Mill Creek's confluence with the main stem of the Sacramento River, the Critical Habitat designation boundary for this species. Sacramento River winter-run Chinook salmon are not known to spawn within the study area; however, juveniles are known to use Mill Creek as non-natal rearing habitat from the confluence to Sherwood bridge which is approximately 0.5 miles downstream from the Exposed Siphon site, and non-natal rearing could potentially occur as far upstream as Ward Dam (M. Johnson, pers. comm. 2014). The purpose of the proposed project is to improve passage conditions for native fish, including Sacramento River winter-run Chinook salmon. **Potentially significant impacts could occur if Sacramento River winter-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. Critical Habitat was initially designated on August 06, 2003. Additional Critical Habitat 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 (USFWS 2004). 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 (USFWS 2004).

The project site is not located in or near the currently designated Critical Habitat, but is located within the current known range of the species. Vernal pool fairy shrimp were observed during site surveys in a vernal pool within the access road to Upper Dam. The existing bare-earth haul roads are highly impacted and are devoid of vegetation. No potential habitat is present within the Ward Dam or Exposed Siphon project sites or haul roads. **Potential 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. Critical Habitat 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 Critical Habitat. Suitable habitat (elderberry shrubs with stems greater than, or equal to, one inch in diameter) exists within 100 feet of the project boundary at the Upper Dam site and the Exposed Siphon site. No exit holes were observed during surveys. **Potential significant impacts to VELB could occur if project construction activities harmed or killed VELB or negatively impacted habitat for this species.**

Vernal Pool Tadpole Shrimp (*Lepidurus packardi*)
The vernal pool tadpole shrimp was listed as Endangered by USFWS on September 19, 1994. Critical Habitat was initially designated on August 06, 2003. Additional Critical Habitat was designated on February 10, 2006. Population declines are attributed to destruction and degradation of vernal pool habitats. Vernal pool fairy 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 (USFWS 2004). 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 (USFWS 2004). 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 (USFWS 2004). They feed on organic debris and living organisms such as fairy shrimp and other invertebrates (USFWS 2006).

The project site is not located in or near the currently designated Critical Habitat, but is located within the current known range of the species. Vernal pool tadpole shrimp were not observed during surveys; however, protocol-level surveys were not conducted. In the absence of protocol-level surveys, presence must be assumed. The seasonal wetland habitat along the haul road to access the Upper Dam project site remains inundated long enough in the spring to provide potential habitat for vernal pool tadpole shrimp. The existing bare-earth haul road are highly impacted and are devoid of vegetation. No potential habitat is present within the Ward Dam or Exposed Siphon project sites or haul roads. **Potential 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 were detected within the study area during acoustical site surveys and may be roosting in potential habitat within the study area. Pallid bats are likely to be foraging in the area; however, foraging activities are unlikely to be disturbed due to the timing of the project work, which will likely occur during daytime hours. Foraging activities are also unlikely to be disturbed due to the availability of extensive foraging habitat available regionally and the temporary nature of the project construction activities. **Potential significant impacts could occur if pallid bat roosting habitat was 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.

Suitable ringtail denning, nesting and foraging habitat is present within the study area in riparian and upland habitats. No ringtail were observed during site surveys; however, they are seldom observed without the use of specialized survey methods due to their strongly nocturnal nature. Foraging is likely to occur 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 this a highly mobile species. **Potential significant impacts could occur if ringtail 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 was listed as a Candidate for listing as Endangered or Threatened by the State of California on December 11, 2013. The main threat to this species is roost loss 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 and mine tunnels, 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 (CDFW 2013b). 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 were detected within the study area during acoustical site surveys; however, this species would not be expected to roost in the immediate vicinity of the project due to a lack of suitable roosting habitat (rock crevices, cliffs, caves and buildings). Townsend's big-eared bats are likely to be foraging in the area; however, foraging activities are unlikely to be disturbed due to the timing of the project work, which will likely occur during daytime hours, the availability of extensive foraging habitat available regionally and the temporary nature of the project construction activities. **No significant impacts to 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. Females favor ponderosa pine habitats during the reproductive season (Williams 1986). Occupied habitats range from arid deserts and grasslands to mixed conifer forests (Zeiner et al. 1990b).

Spotted bats were not detected during site surveys although they were detected in 2012, north of the site in the Dye Creek Preserve (J. Shedd pers. comm. 2014). Spotted bats would not be expected to roost in the immediate vicinity of the project due to a lack of suitable roosting habitat (rock crevices, cliffs, caves and buildings), but they may forage within the study area if roosting habitat is located in the general vicinity. Spotted bats may be foraging in the area; however, foraging activities are unlikely to be disturbed due to the timing of the project work, which will likely occur during daytime hours, the availability of extensive foraging habitat available regionally, and the temporary nature of the project construction activities. **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 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 were not detected during site surveys although they were detected in 2012, north of the site in the Dye Creek Preserve (J. Shedd pers. comm. 2014). Western mastiff bats would not be expected to roost in the immediate vicinity of the project due to a lack of suitable roosting habitat (rock crevices, cliffs, caves and buildings), but they may forage within the study area if roosting habitat is located in the general vicinity. Western mastiff bats may be foraging in the area; however, foraging activities are unlikely to be disturbed due to the timing of the project work, which will likely occur during daytime hours, the availability of extensive foraging habitat available regionally and the temporary nature of the project construction activities. **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 a variety of animals that prey on red bats, including owls, hawks, opossums, cats, and jays. Their roosting habitat includes forests and woodlands, ranging from sea level to mixed conifer forests. They roost 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 were acoustically detected during site surveys and are known to occur north of the site in the Dye Creek Preserve. Potential roosting habitat is present in riparian habitats within the study area. Short term impacts to roosting bats could occur if bats were roosting in close proximity to construction operations; however, these impacts would not generally be considered a significant impact because of the temporary nature and short duration of the construction. Western red bats are likely to be foraging in the area; however, foraging activities are unlikely to be disturbed due to the timing of the project work, which will likely occur during daytime hours, the availability of extensive foraging habitat available regionally and the temporary nature of the project construction activities. **No significant impacts to the western red bat are anticipated from the proposed project.**

Natural Communities

Several riparian habitats identified as CNDDB rare communities including the Great Valley Cottonwood Riparian Forest, Great Valley Valley Oak Riparian Forest and Great Valley Willow Scrub will be temporarily impacted by the project through construction activities. A small amount of riparian vegetation will be disturbed in all project sites (TES 2015) and the southern bank at the Ward Dam project site will be removed and rebuilt. All disturbed areas will be revegetated after construction is complete.

The instream habitats identified as CNDDB rare communities including the Central Valley drainage fall-run Chinook stream, the Central Valley drainage hardhead / squawfish stream and Central Valley drainage valley floor river, will also be temporarily impacted by the project. The instream habitats will be positively affected by the improvements to fish passage conditions, to enable anadromous fish access additional upstream habitat.

A wetland delineation was conducted (TES 2015) 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 processes.

CONCLUSIONS AND RECOMMENDED AVOIDANCE AND MINIMIZATION MEASURES

Listed and Candidate Species

Fifteen federally- and / or state-listed animal species have the potential to occur within the study area, including the American bald eagle, California red-legged frog, tricolored blackbird, Swainson's hawk, western yellow-billed cuckoo, little willow flycatcher, bank swallow, green sturgeon, Central Valley steelhead, Central Valley spring-run Chinook salmon, Sacramento River winter-run Chinook salmon, vernal pool fairy shrimp, valley elderberry longhorn beetle, vernal pool tadpole shrimp and the Townsend's big-eared bat. Of these fifteen species, eight may be potentially impacted by the project including the Swainson's hawk, American bald eagle, Central Valley steelhead, Central Valley spring-run Chinook salmon, Sacramento River winter-run Chinook salmon, vernal pool fairy shrimp, valley elderberry longhorn beetle and vernal pool tadpole shrimp. Recommended avoidance and minimization measures are provided for these eight species below.

<u>Swainson's Hawk and American Bald Eagle</u>
Potentially significant impacts could occur if Swainson's hawk or American bald eagle 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 seven days prior to the initiation of the onset of these activities. 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.

Central Valley Steelhead, Central Valley Spring-run Chinook Salmon and Sacramento River Winter-run Chinook Salmon

- NMFS should be consulted to 1) determine if full protocol-level surveys will be required, 2) develop appropriate avoidance and minimization measures, and 3) determine whether an Endangered Species Act Section 7 take permit will be required for the project.

- Instream construction work shall be conducted between July 15 and October 14 to minimize impacts to anadromous fish by working when water temperatures are warmer and anadromous fish are less likely to be present. Work within the channel and banks, outside of this instream work window must be isolated from flowing water and fish rescue will be required prior to the onset of any dewatering of the area.

- All construction debris (concrete, metal, etc.) from the fish passage improvement-related construction activities will be removed from the active stream channel post-construction.

- Prior to construction, exclusionary fish netting shall be installed upstream and downstream of the construction area. USFWS, in coordination and consultation with NMFS and CDFW, will ensure that qualified fish biologists are onsite to implement fish rescue operations through the use of herding, seining and / or electrofishing, if necessary. Best professional determination will be used to decide which method(s) of rescue and location of exclusionary netting is most appropriate. 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, the NMFS electrofishing guidelines (NMFS 2000) will be strictly followed. The fish rescue team will be comprised of fishery biologists with professional experience using seines and electrofishing equipment.

- Adequate erosion and pollution control measures should be taken to ensure that sediment, turbidity, petroleum products or other harmful chemicals do not enter Mill Creek as a result of construction activities. Standard Best Management Practices (BMPs) should be incorporated into the project designs.

- BMPs will be developed and implemented to ensure that wet concrete does not enter Mill Creek during construction.

- All pumps used during dewatering for construction will be screened to meet CDFW and NMFS criteria.

- All dewatering and rewatering activities will be conducted slowly, in order to minimize disturbance to fish.

Valley Longhorn Elderberry Beetle

- To reduce potential impacts to VELB to less than significant levels, the proposed project should comply with USFWS established mitigation guidelines for VELB dated September 1996.

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 or other large branchiopod (fairy shrimp, tadpole shrimp) habitats at the Upper Dam site only, 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 are not to be disturbed.

- ❖ No road grading or road improvements should be allowed in or near large branchiopod habitat.

- ❖ All transporters of potentially hazardous materials (fuel, oil, cement, etc.) will be notified as to the presence of vernal pools / swales and required to inspect their vehicles prior to entry and exit of the areas containing vernal pools / swales, 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 and Fully Protected Species

Sixteen species designated by CDFW as Species of Special Concern and Fully Protected species could potentially be significantly impacted by the proposed project. Recommended avoidance and minimization measures are provided for these sixteen species below.

Western Pond Turtle, Foothill Yellow-legged Frog

- ❖ Prior to work in aquatic habitats, water bodies should be surveyed by a qualified biologist to determine if any foothill yellow-legged frogs or western pond turtles are present. If any individuals of these species are found, a qualified and permitted biologist should determine and implement appropriate relocation procedures. Herpetological exclusion fencing should be erected around the perimeter of the instream work area prior to construction initiation. Fencing should remain until work in aquatic habitats is complete.

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

- ❖ 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).

- ❖ 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 seven 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.

Long-eared Owl, Burrowing Owl, Northern Harrier, Golden Eagle 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 long-eared owl, burrowing owl, northern harrier, golden eagle and white-tailed kite.

River Lamprey, Hardhead, Fall- / Late-fall run Chinook Salmon

- The avoidance and minimization measures identified for Central Valley steelhead, Central Valley spring-run Chinook salmon and Sacramento River winter-run Chinook salmon will adequately mitigate for any potential impacts to river lamprey, hardhead and Central Valley fall-run and late fall-run Chinook salmon.

Pallid Bat

- Prior to any construction work, a survey should be conducted by an experienced bat biologist to ensure that pallid bats are not roosting within the areas to be disturbed.

- If pallid bats are found to be roosting within the study area, construction activities should be suspended until a qualified biologist, in consultation with CDFW, can establish appropriate measures to minimize impacts to pallid bats.

Ringtail

- Potential ringtail denning habitat exists within the study area in the form of hollow trees. Prior to construction, a biologist will inspect potential denning sites within the area to be disturbed to determine if denning is occurring.

- If ringtail are found to be denning, construction activities should be suspended until a qualified biologist, in consultation with CDFW, can establish appropriate measures to minimize impacts to ringtail.

Other Nesting Raptors and Migratory Birds

The following avoidance and minimization measures are recommended in order to avoid potentially significant impacts of the proposed project on other nesting raptors and migratory birds:

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 migratory birds.

Other Nesting Migratory Birds

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

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:

Riparian Habitat

- Disturbing riparian habitat that is present within the study area associated with Mill Creek should be avoided, where possible. For riparian habitat that cannot be avoided, appropriate avoidance and minimization measures will need to be developed during the environmental permit processes with CDFW and other regulatory agencies.
- All disturbed riparian areas should be revegetated following the completion of construction activities.

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

- Disturbance to instream habitats should 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 U.S. Army Corps of Engineers. In addition, a Clean Water Act Section 401 Certification may also be required from the California Regional Water Quality Control Board. It has been determined that a California Fish and Game Code Section 1600 Lake or Streambed Alteration Agreement with CDFW will not 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:

- All onsite personnel should receive instruction regarding the presence of special-status species and the importance of avoiding impacts to those species and their habitat.

- A qualified biologist (biological monitor) should be present onsite and should inspect any construction related activities to ensure that no unnecessary disturbance to special-status species and / or their associated habitats occurs. The biological monitor should have the authority to stop all activities that may result in such disturbance until appropriate corrective measures have been completed. The biologist will also be required to report any unauthorized take to the USFWS and / or NMFS immediately.

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. A "may affect, not likely to adversely affect" determination is anticipated for western yellow-billed cuckoo at the Exposed Siphon, Ward and Upper Dam sites. A "may affect, not likely to adversely affect" determination is anticipated for VELB at the Exposed Siphon and Upper Dam sites. An unavoidable "may affect, likely to adversely affect" determination is anticipated for vernal pool fairy shrimp and vernal pool tadpole shrimp at the Upper Dam site. This will be addressed as part of the consultation with 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. This will be addressed as part of the consultation with NMFS under Section 7 of the Endangered Species Act. A "may affect, but is not likely to adversely modify" determination is anticipated for Central Valley steelhead and Central Valley spring-run Chinook salmon Critical Habitat. This will also be addressed as part of the consultation with NMFS under Section 7 of the Endangered Species Act. With incorporation of these avoidance and minimization measures, the project is not expected to jeopardize the continued existence of any listed species.

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APPENDIX A

CNDDB Records Search Results

APPENDIX A
CNDDB Records Search Results
Mill Creek Fish Passage Restoration Project

COMMON NAME	SCIENTIFIC NAME	USGS 7.5' QUADRANGLE								
		DEPE	TUSP	REBL	GERB	CORN	ACHO	LOMO	VINA	RISP
FAUNAL SPECIES										
Tricolored Blackbird	*Agelaius tricolor*				X				X	
Blennosperma Vernal Pool Andrenid Bee	*Andrena blennospermatis*			X						
Antioch Dunes Anthicid Beetle	*Anthicus antiochensis*				X			X		
Sacramento Anthicid Beetle	*Anthicus sacramento*				X			X	X	
Pallid Bat	*Antrozous pallidus*			X				X		
Great Egret	*Ardea alba*							X		
Great Blue Heron	*Ardea herodias*							X		
Burrowing Owl	*Athene cunicularia*			X	X	X				
Conservancy Fairy Shrimp	*Branchinecta conservatio*								X	X
Vernal Pool Fairy Shrimp	*Branchinecta lynchi*			X	X	X			X	X
Swainson's Hawk	*Buteo swainsoni*			X	X	X			X	X
Western Yellow-billed Cuckoo	*Coccyzus americanus occidentalis*		X	X	X	X		X	X	
Townsend's Big-eared Bat	*Corynorhinus townsendii*							X		
Yellow Warbler	*Setophaga petechia*		X	X	X			X		
Valley Elderberry Longhorn Beetle	*Desmocerus californicus dimorphus*			X	X			X	X	
White-tailed Kite	*Elanus leucurus*				X					

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Mill Creek Fish Passage Restoration Project

COMMON NAME	SCIENTIFIC NAME	USGS 7.5' QUADRANGLE								
		DEPE	TUSP	REBL	GERB	CORN	ACHO	LOMO	VINA	RISP
Western Pond Turtle	*Emys marmorata*	X			X	X	X	X		
Western Mastiff Bat	*Eumops perotis californicus*		X	X					X	X
Prairie Falcon	*Falco mexicanus*	X					X			
Yellow-breasted Chat	*Icteria virens*		X	X	X			X		
Silver-haired Bat	*Lasionycteris noctivagans*								X	
Western Red Bat	*Lasiurus blossevillii*			X				X	X	
Hoary Bat	*Lasiurus cinereus*			X				X	X	
Vernal Pool Tadpole Shrimp	*Lepidurus packardi*				X				X	X
California Linderiella	*Linderiella occidentallis*								X	X
Long-eared Myotis	*Myotis evotis*			X				X		
Yuma Myotis	*Myotis yumanesis*			X				X		
Steelhead – Central Valley DPS	*Oncorhynchus mykiss irideus*	X	X	X	X		X	X	X	X
Chinook Salmon - Central Valley Spring-run ESU	*Oncorhynchus tshawytscha*	X					X			
Chinook Salmon - Central Valley Winter-run ESU	*Oncorhynchus tshawytscha*			X	X			X	X	
Osprey	*Pandion haliaetus*			X	X			X	X	
Foothill Yellow-legged Frog	*Rana boylii*	X						X		
Bank Swallow	*Riparia riparia*			X	X			X	X	

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Mill Creek Fish Passage Restoration Project

COMMON NAME	SCIENTIFIC NAME	USGS 7.5' QUADRANGLE								
		DEPE	TUSP	REBL	GERB	CORN	ACHO	LOMO	VINA	RISP
Western Spadefoot	*Spea hammondii*									X
Least Bell's Vireo	*Vireo bellii pusillus*			X	X			X		
NATURAL COMMUNITIES										
Central Valley Drainage Fall-Run Chinook Stream							X	X	X	X
Central Valley Drainage Hardhead / Squawfish Stream							X	X	X	X
Central Valley Drainage Spring-Run Chinook Stream							X			
Central Valley Drainage Valley Floor River								X	X	
Coastal and Valley Freshwater Marsh									X	
Great Valley Cottonwood Riparian Forest				X	X			X	X	
Great Valley Mixed Riparian Forest				X	X			X	X	
Great Valley Valley Oak Riparian Forest				X	X				X	
Great Valley Willow Scrub					X				X	

LEGEND:

DEPE = Dewitt Peak
TUSP = Tuscan Springs
REBL = Red Bluff East
GERB = Gerber
CORN = Corning
ACHO = Acorn Hollow
LOMO = Los Molinos
VINA = Vina
RISP = Richardson Springs NW

APPENDIX B

Potentially Occurring Special-status Species

APPENDIX B
Potentially-occurring Special-status Species
Mill Creek Fish Passage Restoration Project

SPECIES	LISTING STATUS		TYPICAL HABITAT	POTENTIAL FOR OCCURRENCE
Common Name (*Scientific Name*)	Federal	State		
AMPHIBIANS & REPTILES				
Western Pond Turtle (*Emys marmorata)*	---	CSC	In or near aquatic habitats in slow moving water. Often associated with basking substrate (e.g. logs, large rocks, etc.). Uses adjacent uplands to nest and overwinter.	Observed during site surveys. Known to occur north of project site within the Dye Creek Preserve.
Foothill Yellow-legged Frog *(Rana boylii)*	---	CSC	In or near rocky streams in a variety of habitats. Rarely encountered far from permanent water.	Observed during site surveys. Known to occur north of project site within the Dye Creek Preserve.
California Red-legged Frog *(Rana draytonii)*	T	CSC	Slow moving or pooled aquatic habitats with overhanging vegetation.	Not likely to occur within the study area due to the fact that the study area is well outside the current known range of the species and the marginal breeding habitat within the project site. Not observed during site surveys; however protocol surveys were not conducted.
Western Spadefoot *(Spea hammondii)*	---	CSC	Shallow grasslands and occasionally valley foothill hardwood woodlands. Shallow temporary pools for breeding.	Potential breeding habitat present within the project site. Not observed during site surveys.
BIRDS				
Tricolored Blackbird *(Agelaius tricolor)*	---	E	Breeds in tall emergent vegetation with access to open water. Forages in grassland, agricultural lands.	Observed flying through the study area during site surveys. Not likely to nest due to a lack of suitable nesting habitat. May forage within the project area if nesting habitat is present in the general area. Known to occur north of project site within the Dye Creek Preserve.
Grasshopper Sparrow *(Ammodramus savannarum)*	---	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.	Potential nesting and foraging habitat present within the project site. Not observed during site surveys. Known to occur north of project site within the Dye Creek Preserve.

APPENDIX B
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Mill Creek Fish Passage Restoration Project

SPECIES	LISTING STATUS		TYPICAL HABITAT	POTENTIAL FOR OCCURRENCE
Common Name (*Scientific Name*)	Federal	State		
Golden Eagle *(Aquila chrysaetos)*	---	FP	Uses rolling foothills and mountain terrain, wide arid plateaus, some deeply cut by streams and canyons, open mountain slopes, and cliffs and rock outcrops. Generally inhabit areas with open country.	Not likely to nest due to a lack of suitable nesting habitat. Potential foraging habitat present within the project site. Observed during site surveys. Known to nest north of project site within the Dye Creek Preserve.
Short-eared Owl *(Asio flammeus)*	---	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.	Not likely to nest within the study area due to the fact that the study area is well outside the current known range of nesting for the species. Potential winter foraging habitat may be present within the project site. Not observed during site surveys.
Long-eared Owl *(Asio otus)*	---	CSC	Riparian, live oak or conifer thickets with small, dense canopy trees used for roosting and nesting. Generally forages in open areas.	Potential nesting and foraging habitat present within the project site. Not observed during site surveys.
Burrowing Owl *(Athene cunicularia)*	---	CSC	Uses open grasslands, deserts or scrublands. Nest in small mammal burrows, pipes, culverts or nesting boxes. Species is gregarious.	Potential nesting and foraging habitat present within the project site. No individuals observed during site surveys. Known to occur north of project site within the Dye Creek Preserve.
Swainson's Hawk (*Buteo swainsoni)*	---	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.	Potential nesting and foraging habitat present within the project site. Observed flying at high elevations during site surveys. Known to occur north of project site within the Dye Creek Preserve.
Northern Harrier *(Circus cyaneus)*	---	CSC	Nest and forage 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.	Potential nesting and foraging habitat present within the project site. Observed during site surveys. Known to occur north of project site within the Dye Creek Preserve.

APPENDIX B
Potentially-occurring Special-status Species
Mill Creek Fish Passage Restoration Project

SPECIES	LISTING STATUS		TYPICAL HABITAT	POTENTIAL FOR OCCURRENCE
Common Name (*Scientific Name*)	Federal	State		
Western Yellow-billed Cuckoo *(Coccyzus americanus occidentalis)*	T	E	Dense deciduous riparian cover, esp. willow with low level understory foliage, near slow moving water with high humidity, utilizes riparian forests and adjacent orchards for foraging. Requires large ($\geq$ 7 acres) habitat patch sizes for nesting.	Not likely to nest within project site, due to lack of minimum nesting habitat acreage requirements. May forage within the project area if nesting within the general area.
White-tailed Kite *(Elanus caeruleus)*	---	FP	Nests in dense tree stands near open foraging areas. Forages in open grassland and agricultural areas.	Potential nesting and foraging habitat present within the project site. Not observed during site surveys. Known to nest north of project site within the Dye Creek Preserve.
Little Willow Flycatcher *(Empidonax traillii brewsteri)*	---	E	Nests in upper elevation riparian and wet meadow habitats.	Observed during site surveys. Not likely to nest due to low project site elevation. Likely to forage within the project area during spring and fall migration.
American Peregrine Falcon (*Falco peregrinus anatum*)	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.	Nesting habitat present in the vicinity of the project site on the high voltage power lines. Known to forage within the project area. Known to nest north of project site within the Dye Creek Preserve. Observed during site surveys.
American Bald Eagle *(Haliaeetus leucocephalus)*	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.	Potential nesting habitat present within the project site, however there is a low likelihood that nesting will occur without established nests being present. Observed foraging during site surveys. Known to occur north of project site within the Dye Creek Preserve.
Yellow-breasted Chat *(Icteria virens)*	---	CSC	Nests in dense shrubs along streams and rivers.	Observed during site surveys. Known to nest north of project site within the Dye Creek Preserve. Likely to nest and forage within the project area.

APPENDIX B
Potentially-occurring Special-status Species
Mill Creek Fish Passage Restoration Project

SPECIES	LISTING STATUS		TYPICAL HABITAT	POTENTIAL FOR OCCURRENCE
Common Name (*Scientific Name*)	Federal	State		
Loggerhead Shrike *(Lanius ludovicianus)*	---	CSC	Prefers open habitats with scattered trees, shrubs, posts, fences and other perches. Found primarily in valley-foothill and desert habitats.	Observed during site surveys. Known to nest north of project site within the Dye Creek Preserve. Likely to nest and forage within the project area.
American White Pelican *(Pelecanus erythrorhynchos)*		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.	Not likely to nest due to a lack of suitable nesting habitat. May forage within the project area. Observed during site surveys.
Bank Swallow *(Riparia riparia)*	---	T	Nests in excavated burrows in fine-textured vertical stream banks.	Not likely to nest due to a lack of suitable nesting habitat. May forage within the project area if nesting habitat is present in the general area. Not observed during site surveys.
Yellow Warbler *(Setophaga petechia)*	---	CSC	Nests in riparian habitats and open conifer forests.	May nest in riparian habitats within the project site. Likely to forage within the project site during spring and fall migration if nesting does not occur locally. Known to occur north of project site within the Dye Creek Preserve. Not observed during site surveys.
Least Bell's Vireo *(Vireo bellii pusillus)*	E	E	Lowland riparian areas. Nests in willows, mulefat, wildrose, etc.	Not likely to occur within the study area due to the fact that the study area is well outside the current known range of the species.
FISH				
Green Sturgeon (Southern DPS) (*Acipenser medirostris*)	T	CSC	Requires cool freshwater for spawning in large cobble. Spawning takes place in deep, fast water.	Not likely to occur due to a lack of preferred habitat. Not known to occur within the Mill Creek drainage.

APPENDIX B
Potentially-occurring Special-status Species
Mill Creek Fish Passage Restoration Project

SPECIES	LISTING STATUS		TYPICAL HABITAT	POTENTIAL FOR OCCURRENCE
Common Name (*Scientific Name*)	Federal	State		
River Lamprey *(Lampetra ayresii)*		CSC	Adults spawn in gravelly riffles in river tributary streams. Ammocoetes (young) use silty backwaters and eddies.	Not well studied in Mill Creek. Recent studies of lamprey in Mill Creek have not distinguished between lamprey species. Current identification is insufficient in determining presence. May be present within ammocoete stage and may spawn within study area.
Hardhead *(Mylopharodon conocephalus)*	---	CSC	Low- to mid-elevation streams in the Sacramento and San Joaquin drainage. Also present in the Russian River. Clear, deep pools with sand, gravel, and boulder substrate. Slow water velocity. Not found where exotic centrarchids predominate.	Known to occur within Mill Creek from confluence with Sacramento River to Upper Dam.
Central Valley Steelhead *(Oncorhynchus mykiss)*	T	---	Spawns in cool, clear water with clean spawning gravel in the Sacramento River and many tributaries.	Rainbow trout / steelhead observed during site surveys. Adults and juveniles are known to occur within Mill Creek from confluence with Sacramento River to above Upper Dam.
Central Valley Fall- / Late Fall-run Chinook Salmon *(Oncorhynchus tshawytscha)*	SC	CSC	Spawns in cool, clear water with clean spawning gravel in the Sacramento River and many tributaries.	Adults and juveniles known to occur within Mill Creek from confluence with Sacramento River to Upper Dam. Observed during site surveys.
Central Valley Spring-run Chinook Salmon *(Oncorhynchus tshawytscha)*	T	T	Spawns in the late summer / early fall in cool, clear water with clean spawning gravel in the Sacramento River and some tributaries.	Adults and juveniles known to occur within Mill Creek from confluence with Sacramento River to Upper Dam.
Sacramento River Winter-run Chinook Salmon *(Oncorhynchus tshawytscha)*	E	E	Spawns in the summer in cool, clear water with clean spawning gravel, almost exclusively in the mainstem of the Sacramento River.	Juveniles known to use Mill Creek habitat from the confluence with Sacramento River to Sherwood Bridge for non-natal rearing and could use habitat up to the Ward Dam. Ward Dam is likely the upstream limit for non-natal rearing (M. Johnson pers. comm 2014)
INVERTEBRATES				
Conservancy Fairy Shrimp	E	---	Vernal pool and vernal pool-like habitats.	Potential habitat present within the project site. Not observed during site surveys.

APPENDIX B
Potentially-occurring Special-status Species
Mill Creek Fish Passage Restoration Project

SPECIES	LISTING STATUS		TYPICAL HABITAT	POTENTIAL FOR OCCURRENCE
Common Name (*Scientific Name*)	Federal	State		
Vernal Pool Fairy Shrimp *(Branchinecta lynchi)*	T	---	Vernal pool and vernal pool-like habitats.	Potential habitat present within the project site. Observed during site surveys.
Valley Elderberry Longhorn Beetle *(Desmocerus californicus dimorphus)*	T	---	Elderberry shrubs with stems 1 inch or greater in diameter.	Potential habitat present within the project site. No exit holes observed during site surveys.
Vernal Pool Tadpole Shrimp *(Lepidurus packardi)*	E	---	Vernal pool and ephemeral wetland habitats.	Potential habitat present within the project site. Not observed during site surveys.
MAMMALS				
Pallid Bat *(Antrozous pallidus)*	---	CSC	Uses a wide variety of habitats including grassland, shrubland, woodland and forest. Roosts in caves, mines, crevices, hollow trees and buildings.	Detected during acoustical surveys. Potential roosting habitat present within the project site. Known to occur north of project site within the Dye Creek Preserve.
Ringtail *(Bassariscus astutus)*	---	FP	Riparian habitats and forest and shrub habitats near rocky areas or riparian areas from low to middle elevations.	Potential denning, nesting and foraging habitat present within the project site. Not observed during site surveys.
Townsend's Big-eared Bat *(Corynorhinus townsendii)*	---	C / CSC	Roosts in caves, mines, tunnels and buildings. Very sensitive to human disturbance; however, in some instances it can become habituated to reoccurring and predictable human activity.	Detected during acoustical surveys. No roosting habitat present within the project site. Known to occur north of project site within the Dye Creek Preserve.
Spotted Bat *(Euderma maculatum)*	---	CSC	Prefers to roost in rock crevices on cliffs but also roosts in caves and buildings. Forages over water in a variety of habitats.	No roosting habitat present within the project site. May forage within the project area if roosting habitat is present in the general area. Known to occur north of project site within the Dye Creek Preserve. Not detected during acoustical surveys.

APPENDIX B
Potentially-occurring Special-status Species
Mill Creek Fish Passage Restoration Project

SPECIES	LISTING STATUS		TYPICAL HABITAT	POTENTIAL FOR OCCURRENCE
Common Name (*Scientific Name*)	Federal	State		
Western Mastiff Bat *(Eumops perotis)*	---	CSC	Roosts in rock crevices on cliffs, high buildings, trees and tunnels. Occurs in open arid to semi-arid habitats with abundant roost sites.	No roosting habitat present within the project site. May forage within the project area if roosting habitat is present within the general area. Not detected during acoustical surveys. Known to occur north of project site within the Dye Creek Preserve.
Western Red Bat (*Lasiurus blossevillii*)	---	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.	Detected during acoustical surveys. Known to occur north of project site within the Dye Creek Preserve.

LEGEND:

E = Endangered
T = Threatened
C = Candidate for listing as Endangered or Threatened
P = Proposed for listing as Endangered or Threatened
CSC = California Species of Special Concern
FP = California Fully Protected
SC = NMFS Species of Concern
D = Delisted
PD = Proposed for Delisting
1A = Plants presumed to be extinct in California
1B = Plants rare, threatened or endangered in California and elsewhere
2 = Plants rare, threatened or endangered in California but more common elsewhere
3 = Plants about which we need more information, a review list
4 = Plants of limited distribution, a watch list

APPENDIX C

Faunal Species Observed Within or Near the Project Site

APPENDIX C
Faunal Species Observed Within or Near the Project Site
Mill Creek Fish Passage Restoration Project

COMMON NAME	SCIENTIFIC NAME	LISTING STATUS	
		Federal	State
AMPHIBIANS & REPTILES			
Bullfrog*	*Rana catesbeinana*		
Foothill Yellow-legged Frog	*Rana boylii*		CSC
Gopher Snake	*Pituophis melanoleucus*		
Garter Snake	*Thamnophis sp.*		
Pacific Chorus Frog	*Pseudacris regilla*		
Western Fence Lizard	*Sceloporus occidentalis*		
Western Pond Turtle	*Emys marmorata*		CSC
BIRDS			
Acorn Woodpecker	*Melanerpes formicivorus*		
American Bald Eagle	*Haliaeetus leucocephalus*	D	E / FP
American Crow	*Corvus brachyrhynchos*		
American Goldfinch	*Xanthocephalus xanthocephalus*		
American Kestrel	*Falco sparverius*		
American Peregrine Falcon	*Falco peregrinus*	D	D / FP
American Robin	*Turdus migratorius*		
American White Pelican	*Pelecanus erythrorhynchos*		CSC
Ash–throated Flycatcher	*Myiarchus cinerascens*		
Belted Kingfisher	*Ceryle alcyon*		
Bewick's Wren	*Thryomanes bewickii*		
Black Phoebe	*Sayornis nigricans*		
Blue Grosbeak	*Passerina caerulea*		
Brewer’s Blackbird	*Euphagus cyanocephalus*		
Brown-headed Cowbird	*Molothrus ater*		
Bullock's Oriole	*Icterus bullockii*		
Bushtit	*Psaltriparus minimus*		
California Horned Lark	*Eremophila alpestris actia*		
California Quail	*Callipepla californica*		
California Towhee	*Pipilo crissalis*		
Canada Goose	*Branta canadensis*		
Cedar Waxwing	*Bombycilla cedrorum*		
Chipping Sparrow	*Spizella passerina*		
Cliff Swallow	*Hirundo pyrrhonota*		
Common Merganser	*Mergus merganser*		
Common Raven	*Corvus corax*		
Cooper’s Hawk	*Accipiter cooperii*		
Dark-eyed Junco	*Junco hyemalis*		
Eurasian Collared-Dove*	*Streptopelia decaocto*		
European Starling*	*Sturnus vulgaris*		
Fox Sparrow	*Passerella iliaca*		
Golden Eagle	*Aquila chrysaetos*		CSC / FP
Great Blue Heron	*Ardea herodias*		

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COMMON NAME	SCIENTIFIC NAME	LISTING STATUS	
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Great Egret	*Casmerodius albus*		
Green Heron	*Butorides striatus*		
Hermit Warbler	*Setophaga occidentalis*		
Hooded Merganser	*Lophodytes cucullatus*		
House Finch	*Carpodacus mexicanus*		
House Sparrow*	*Passer domesticus*		
House Wren	*Troglodytes aedon*		
Hummingbird	*Unknown species*		
Killdeer	*Charadrius vociferous*		
Lark Sparrow	*Chondestes grammacus*		
Lesser Goldfinch	*Spinus psaltria*		
Lewis's Woodpecker	*Melanerpes lewis*		
Loggerhead Shrike	*Lanius ludovicianus*		CSC
Little Willow Flycatcher	*Empidonax traillii brewsteri*		E
Mallard	*Anas platyrhynchos*		
Mourning Dove	*Zenaida macroura*		
Northern Flicker	*Calaptes auratus*		
Northern Harrier	*Circus cyaneus*		CSC
Northern Mockingbird	*Mimus polyglottos*		
Nuttall's Woodpecker	*Picoides nuttallii*		
Oak Titmouse	*Parus inornatus*		
Osprey	*Pandion haliaetus*		
Phainopepla	*Phainopepla nitens*		
Red-shouldered Hawk	*Buteo lineatus*		
Red-tailed Hawk	*Buteo jamaicensis*		
Red-winged Blackbird	*Agelaius phoenniceus*		
Ruby-crowned Kinglet	*Regulus calendula*		
Rufous Hummingbird	*Selasphorus rufus*		
Savannah Sparrow	*Passerculus sandwichensis*		
Say's Phoebe	*Sayornis saya*		
Sharp-shinned Hawk	*Accipiter striatus*		
Song Sparrow	*Melospiza melodia*		
Spotted Sandpiper	*Actitus macularia*		
Spotted Towhee	*Pipilo maculatus*		
Swainson's Hawk	*Buteo swainsoni*		T
Swallow	*Unknown species*		
Tree Swallow	*Tachycineta bicolor*		
Tricolored Blackbird	*Agelaius tricolor*		E
Tundra Swan	*Cygnus columbianus*		
Turkey Vulture	*Cathartes aura*		
Western Bluebird	*Sialia mexicana*		
Western Kingbird	*Tyrannus vericalus*		
Western Meadowlark	*Sturnella neglecta*		

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COMMON NAME	SCIENTIFIC NAME	LISTING STATUS	
		Federal	State
Western Scrub-Jay	*Aphelocoma californica*		
Western Tanager	*Piranga ludoviciana*		
Western Wood-Pewee	*Contopus sordidulus*		
White-breasted Nuthatch	*Sitta carolinensis*		
White-crowned Sparrow	*Zonotrichia leucophyrus*		
Wild Turkey*	*Meleagris gallopavo*		
Wilson's Warbler	*Wilsonia pusilla*		
Wood Duck	*Aix sponsa*		
Yellow-breasted Chat	*Icteria virens*		CSC
Yellow-rumped Warbler	*Dendroica coronata*		
FISH			
Bass*	*Micropterus sp.*		
Chinook Salmon (fall-run)	*Oncorhynchus tshawytscha*	SC	
Green Sunfish*	*Lepomis cyanellus*		
Mosquitofish*	*Gambusia affinis*		
Sacramento Pike Minnow	*Ptychocheilus grandis*		
Rainbow Trout (Steelhead)	*Oncorhynchus mykiss*	T	
Sacramento Sucker	*Catostomus occidentalis*		
INVERTEBRATES			
Crayfish	*Unknown species*		
Vernal Pool Fairy Shrimp	*Branchinecta lynchi*	T	
MAMMALS			
American Beaver	*Castor canadensis*		
Big Brown Bat	*Eptesicus fuscus*		
Black-tailed Jackrabbit	*Lepus californicus*		
Brazilian Free-tailed Bat	*Tadarida brasiliensis*		
California Myotis	*Myotis californicus*		
Canyon Bat	*Parastrellus hesperus*		
Coyote	*Canis latrans*		
Hoary Bat	*Lasiurus cinereus*		
Little Brown Myotis	*Myotis lucifugus*		
Long-eared Myotis	*Myotis evotis*		
Long-legged Myotis	*Myotis volans*		
Mule Deer (Black-tailed Deer) (tracks)	*Odocoileus hemionus columbianus*		
Pallid Bat	*Antrozous pallidus*		CSC
Raccoon (tracks)	*Procyon lotor*		
Silver-haired Bat	*Lasionycteris noctivagans*		
Small-footed Myotis	*Myotis ciliolabrum*		
Striped Skunk (tracks)	*Mephitis mephitis*		
Townsend's Big-eared Bat	*Corynorhinus townsendii*		C / CSC

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COMMON NAME	SCIENTIFIC NAME	LISTING STATUS	
		Federal	State
Western Gray Squirrel	*Sciurus griseus*		
Western Red Bat	*Lasiurus blossevillii*		CSC
Yuma Myotis	*Myotis yumanensis*		

LEGEND:

E = Endangered
T = Threatened
C = Candidate for listing as Endangered or Threatened
P = Proposed for listing as Endangered or Threatened
CSC = California Species of Special Concern
FP = California Fully Protected
SC = NMFS Species of Concern
D = Delisted
PD = Proposed for Delisting
***** = Non-native Species

APPENDIX D

Site Photos

Photo 1. View of the Exposed Siphon and instream and riparian habitat, on Mill Creek, looking west from the south bank. Photo date: June 30, 2014.

Photo 2. View of the riparian and upland habitat on the south bank downstream of the Exposed Siphon, on Mill Creek, looking southwest. Photo date: December 2, 2014.

Photo 3. View of Exposed Siphon on Mill Creek, instream and riparian habitat, on Mill Creek, looking northwest from the south bank. Photo date: December 2, 2014.

Photo 4. View of Ward Dam, fish ladder, diversion canal wall and riparian habitat, on Mill Creek, looking east. Photo date: June 30, 2014.

Photo 5. View of Ward Dam fish screen, canal and riparian habitat, on Mill Creek, looking northeast. Photo date: June 30, 2014.

Photo 6. View of the Ward Dam fish ladder, canal wall and riparian habitat, on Mill Creek, looking northwest. Photo date: December 2, 2014.

Photo 7. View of the Upper Dam, fish ladder, head gate and diversion canal on Mill Creek, looking east-southeast. Photo date: June 30, 2014.

Photo 8. View of the Upper Dam fish screen, diversion canal and riparian habitat, on Mill Creek, looking east-southeast. Photo date: June 30, 2014.

Photo 9. View of the Upper Dam canal and riparian habitat, on Mill Creek, looking east-southeast. Photo date: December 2, 2014.

Photo 10. View of bat detection equipment deployment in blue oak savannah habitat near Upper Dam site, on Mill Creek. Photo date: June 30, 2014.

Photo 11. View of a vernal pool created by heavy road traffic on the haul road to access Upper Dam site on Mill Creek, within the annual grassland habitat. Photo date: January 7, 2014.

Photo 12. View of an ephemeral stream road crossing on the haul road to access Upper Dam site on Mill Creek, within annual grassland habitat. Photo date: May 14, 2014.