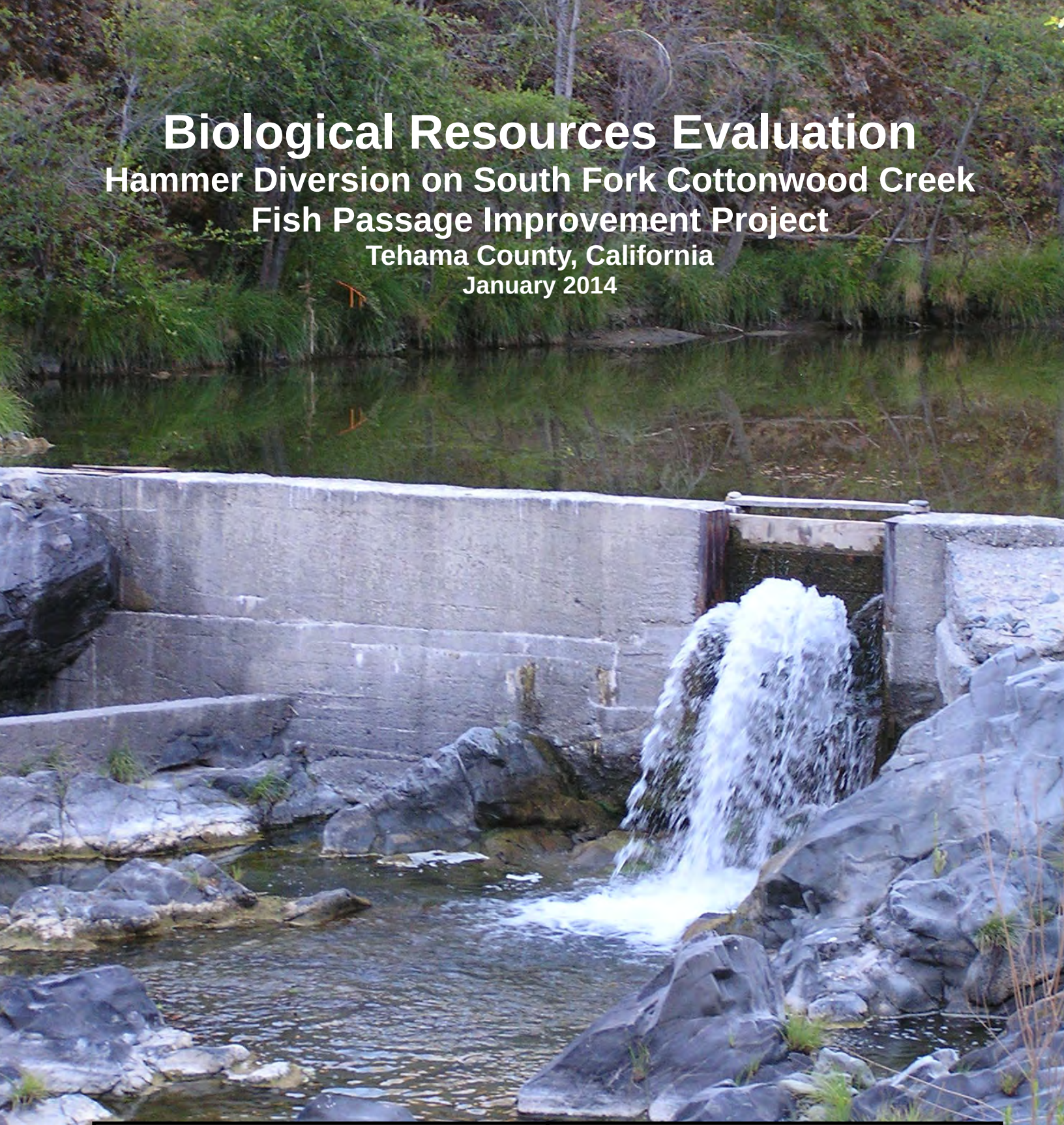
Biological Resources Evaluation

Hammer Diversion on South Fork Cottonwood Creek Fish Passage Improvement Project

Tehama County, California

January 2014



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INTRODUCTION

Tehama Environmental Solutions, Inc. (TES) conducted this Biological Resources Evaluation (BRE) for Northwest Hydraulic Consultants (NHC) for the proposed Hammer Diversion on South Fork Cottonwood Creek Fish Passage Improvement 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 & Guardino Consulting 2013).

Proposed Project

The purpose of the project is to improve passage for anadromous fish in the South Fork of Cottonwood Creek. The removal of the Hammer diversion dam will provide access for fish to the upper reaches of historic spawning and rearing habitat. The project includes the removal of an existing diversion dam, the installation of a new wet well diversion pump and National Marine Fisheries Service (NMFS)-approved fish screen, the replacement of a hydro-electric generating system with a solar electric system, and improvements to an irrigation system including a more efficient water conveyance and storage system. Dam removal will be accomplished using explosives, which will occur in a single day. Due to the extremely remote location of the dam (there is no vehicle access to the site), concrete rubble from the demolished dam will be left in place, after any exposed metal is removed. The new diversion pump and fish screen will be installed using a single piece of heavy equipment, which will be flown in and out of the site using a helicopter. A concrete structure will be installed to anchor the pumping station and new irrigation water piping will be installed through the diversion tunnel and along the existing open ditch system to minimize percolation losses.

The project is being implemented by the U.S. Fish and Wildlife Service (USFWS) in cooperation with the private landowner and the Hammer Project Technical Team, which includes representatives from the USFWS, U.S. Bureau of Reclamation (Reclamation), NMFS, California Department of Fish and Wildlife (DFW), California Department of Water Resources (DWR) and several private consulting firms.

Study Area Location

The study area is located approximately 35 miles west of Red Bluff, in Tehama County, California (Figure 1). Specifically, the study area is located in Section 12, Township 26 North, Range 8 West MDBM, within the 7.5-minute U.S. Geological Survey (USGS) Raglin Ridge quadrangle map (Figure 2). The study area includes the approximate footprint of the project, as well as an approximately 200-foot surrounding buffer area.

ENVIRONMENTAL SETTING

General Site Characteristics

The study area is located in the foothills of the Coastal Range within the property boundary of a private landowner. The 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 site has a general southern and eastern aspect and drains to the east. The elevation of the site ranges from approximately 1,501 feet above mean sea level at the diversion dam on the South Fork of Cottonwood Creek, to 1,480 feet at the residence. The study area has been developed over many years as a residence with a stream

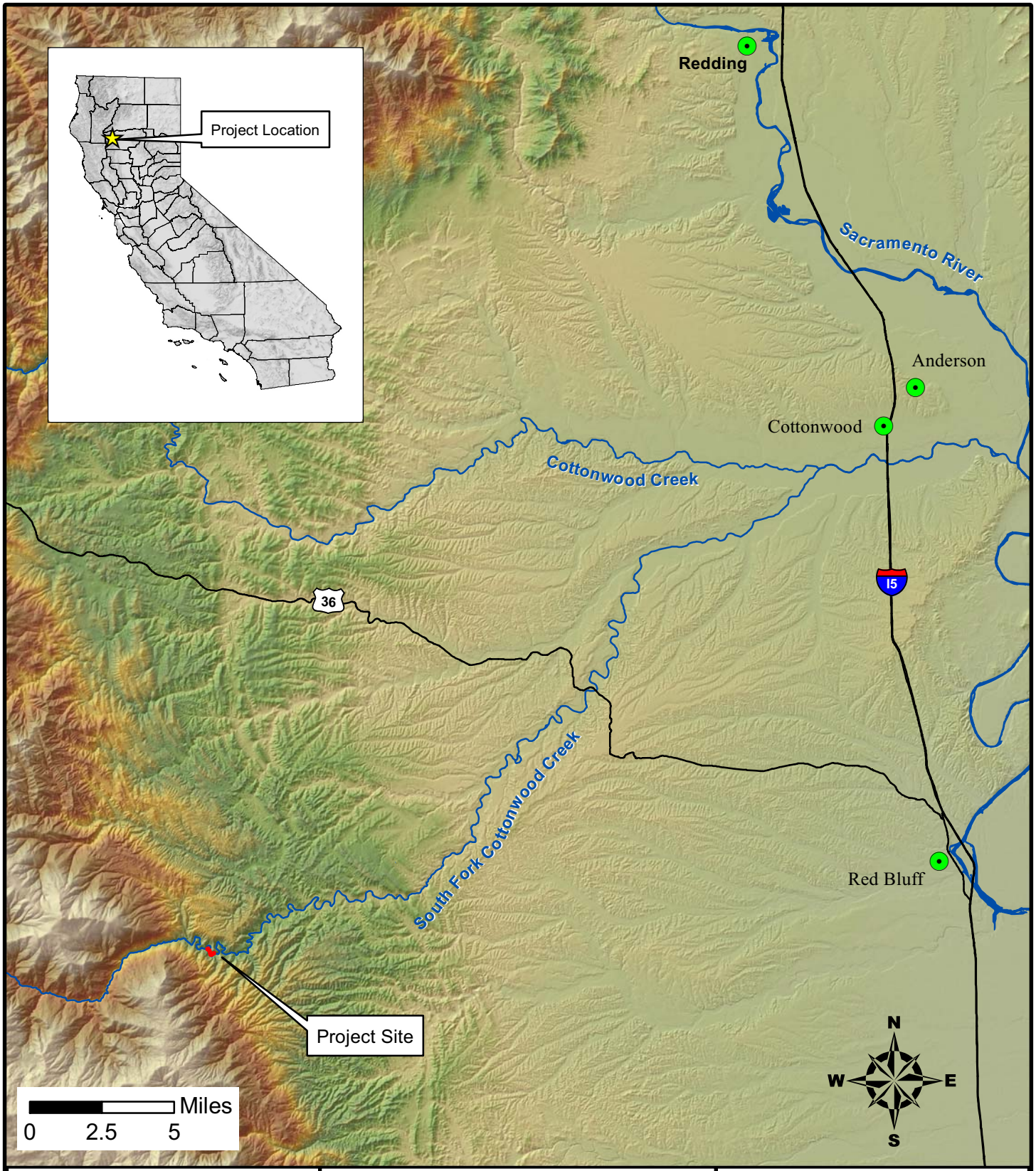

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FIGURE 1

Site Vicinity Map

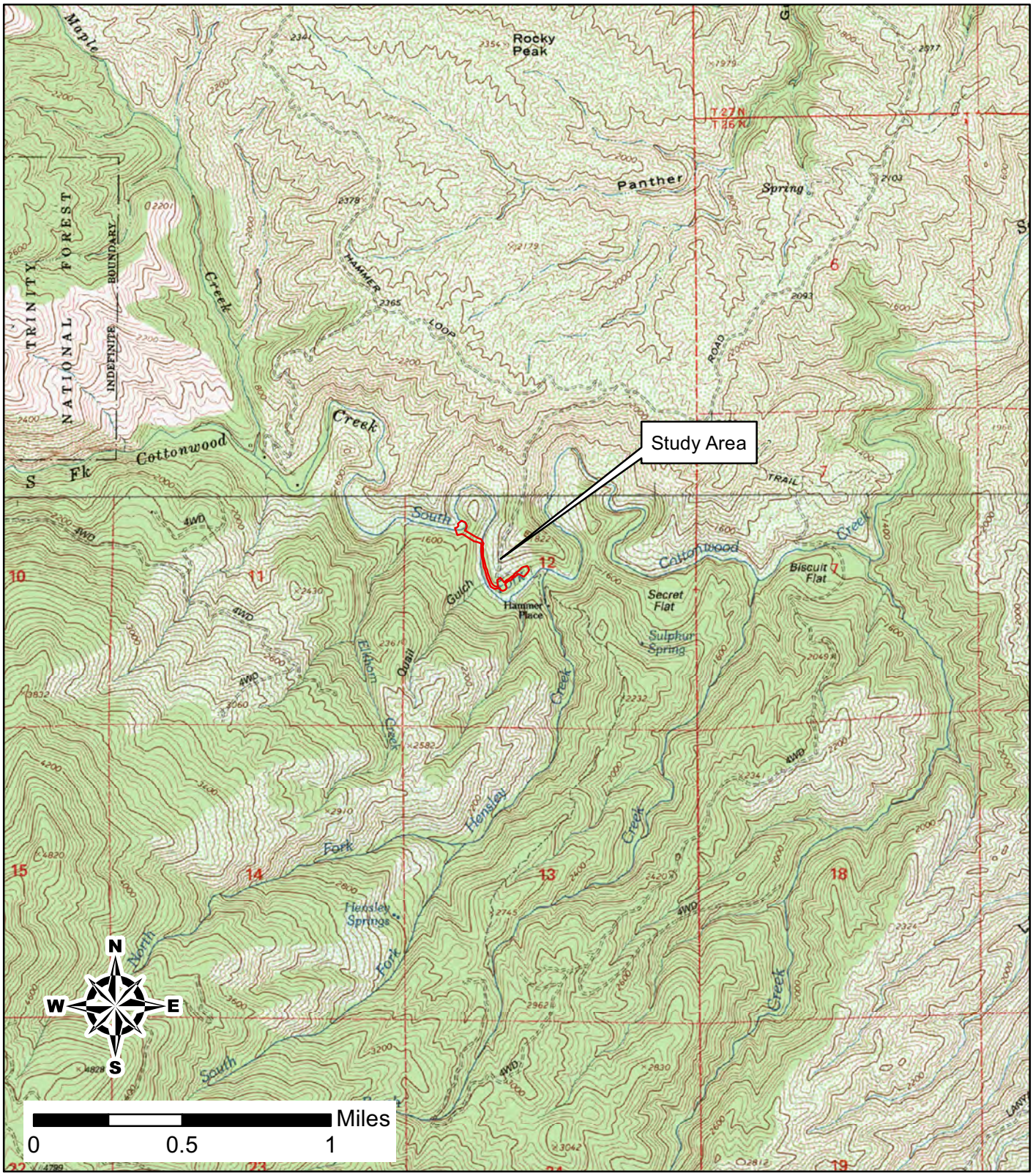

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FIGURE 2

Site Location Map

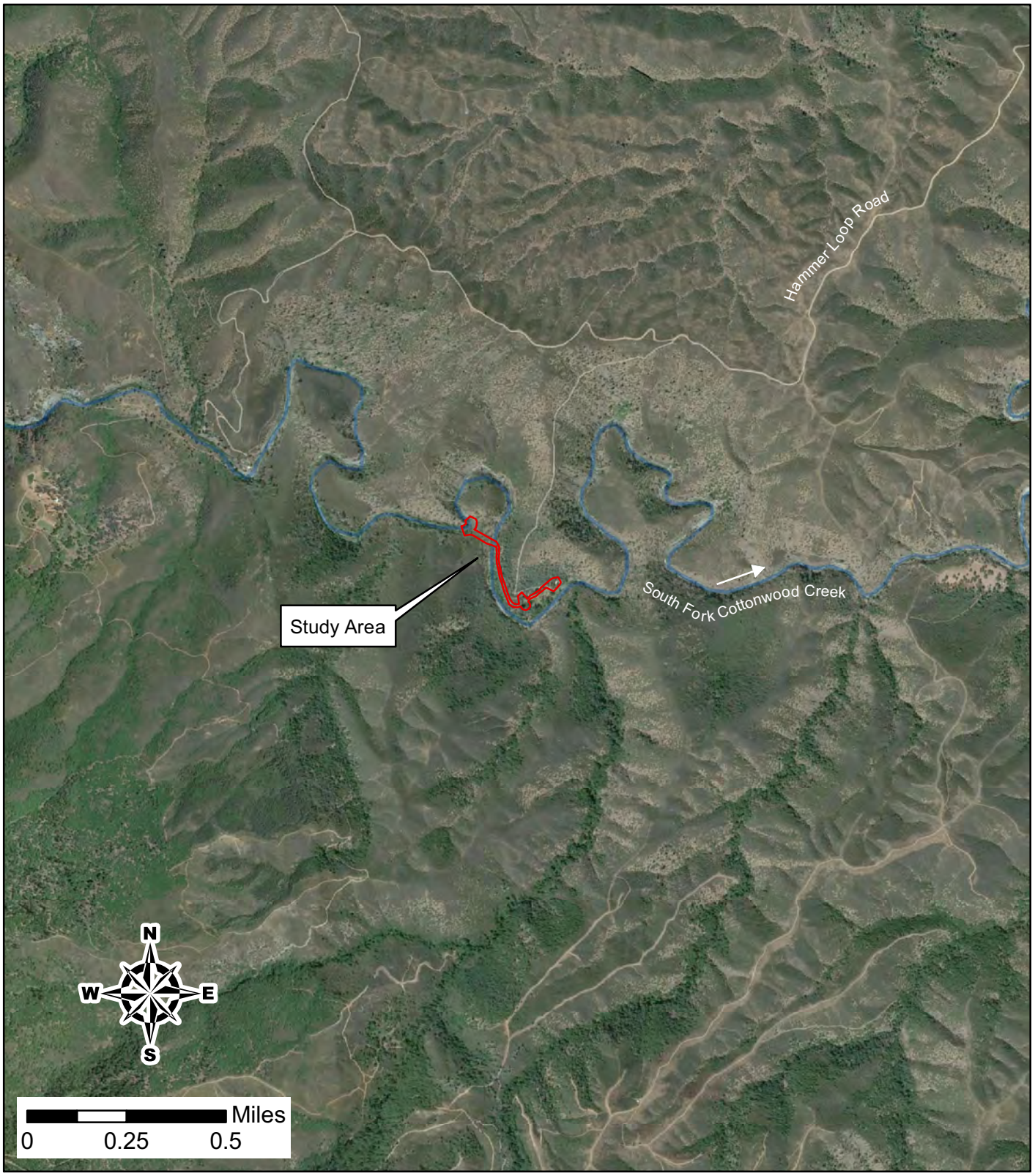

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FIGURE 3

Site Location Map

diversion system that supplies electricity and irrigation water for an orchard/garden and landscaping. The stream diversion system includes an in-stream concrete diversion dam, a constructed conveyance tunnel, a suspension bridge-supported culvert, an unlined ditch system and a constructed storage pond.

Land Use

The project area is used as a rural residence with associated infrastructure for power and water. The property is not used for any type of livestock grazing. The main structures on the site include the diversion dam, a diversion tunnel, two suspension bridges, a residence and numerous outbuildings.

Hydrology

The South Fork of Cottonwood Creek is a perennial stream which is a tributary to the mainstem of Cottonwood Creek that eventually flows into the Sacramento River. The Cottonwood Creek watershed includes a total area of 938 square miles and drains from west to east to the Sacramento River. The South Fork of Cottonwood Creek joins Cottonwood Creek approximately 12 miles west of the confluence with the Sacramento River. No other streams are present within the study area, however there are a number of perennial, intermittent and ephemeral streams in the general area.

The Hammer diversion has an appropriative water right for three cubic feet per second. Water from the diversion is then conveyed through a constructed tunnel that directs water to a hydro-electric generator, and to a culvert that conveys irrigation water across the canyon to the unlined ditch. From there, the water is diverted and pumped from the ditch for irrigation and conveyed to a small storage pond.

Soils

One soil map unit occurs within the study area according to the local soil survey (USDA-SCS et al. 1967). The one identified map unit is listed below:

Maymen and Lodo gravelly loams, 30 to 65 percent slopes (MbgE)
This soil map unit exists in the mountainous areas of the western part of the county. It is composed of Maymen gravelly loam, 30 to 65 percent slopes and Lodo shaly loam, 30 to 65 percent slopes, eroded. The depth to the broken and weathered rock is from 6 to 20 inches in the Maymen soil and is 6 to 10 inches in the Lodo. The erosion hazard is severe to very severe. The series is not classified taxonomically by higher categories in the soil survey. According to the USDA-Natural Resources Conservation Service (NRCS) Official Soil Series Descriptions (USDA-NRCS website), the Maymen soil series is classified as a loamy, mixed, active, mesic, shallow Typic Dystroxerept. The Lodo soil series is classified as a loamy, mixed, superactive, thermic Lithic Haploxeroll.

Vegetation / Plant Communities

Four habitat types generally occur within the study area as defined by the California Wildlife-Habitat Relationships (WHR) classification system (Mayer & Laudenslayer 1988). The habitat types include: Mixed Chaparral, Valley Foothill Riparian, Riverine and Fresh Emergent Wetland habitats.

The mixed chaparral is comprised of a variety of shrub species including chamise (*Adenostoma fasciculatum*), manzanita (*Arctostaphylos sp.*), mountain-mahogany *(Cercocarpus betuloides)*, buck brush (*Ceanothus cuneatus*), poison oak (*Toxicodendron diversilobum*), western redbud (*Cercis occidentalis*) and a mix of other shrub species. Scattered foothill pines (*Pinus sabiniana*) are also present.

Riverine habitat is present within the channel of the South Fork of Cottonwood Creek. The creek channel is primarily devoid of vegetation, but the exposed barren rock and gravel along both banks of the stream support scattered woody and herbaceous species such as willows *(Salix spp.)*, white alder (*Alnus rhombifolia)*, narrow-leaved milkweed *(Aesclepias fascilularis)* deer grass (*Muhlenburgia rigens*) and torrent sedge (*Carex nudata*).

Valley/foothill riparian habitat is present along the banks of the South Fork of Cottonwood Creek. In some reaches of the creek, the riparian habitat is scattered and discontinuous, while in other areas, such as immediately upstream of the diversion dam, it exists as a corridor on both banks. The dominant woody plant species is white alder with several other species including narrow-leaved willow (*Salix exigua),* red willow (*Salix laevigata*), Fremont cottonwood (*Populus fremontii*), mulefat (*Baccharis salicifolia*), California grape (*Vitis californica*), arroyo willow (*Salix lasiolepis*) and Himalayan blackberry (*Rubus armeniacus*). The herbaceous layer includes deer grass, torrent sedge and mugwort (*Artemisia douglasiana*).

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) (DFW 2013a) 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 Raglin Ridge 7.5' quadrangle, in which the project is located, as well as the eight adjoining quadrangles (Cold Fork, Tomhead Mountain, South Yolla Bolly, Ball Mountain, Riley Ridge, Paskenta, Lowry and Oxbow Bridge).

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 study area and is included as Appendix B. For the purposes of this evaluation, special-status species are defined as:

1. Those species listed by the USFWS or NMFS as Endangered, Threatened, Proposed as Endangered or Threatened, Candidate to become Proposed, or Species of Concern.

2. Those species listed by the DFW 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 (DFW 2011).

Wildlife / Fisheries Survey

A biological field survey was conducted on August 14, August 15, and August 16, 2013, 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 August and September 2013. The study area included the entire project footprint, as well as an approximately 200-foot surrounding buffer area. The surveys were conducted by walking the entire property 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. With the exception of partial protocol-level California red-legged frog *(Rana draytonii)* surveys, no other protocol-level wildlife or fisheries surveys were conducted.

Additionally, to survey for bat species, two Pettersson DX-500 full spectrum, ultrasound, acoustical recording devices were deployed during the evening hours of August 14 and August 15, 2013. This 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 different locations each evening for a total of four different locations in order to sample varying habitats. The habitats sampled included riparian / riverine, an upland ridge top and an area near several outbuildings. 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).

Natural Communities

The DFW 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 did not indicate any past recorded occurrences of special-status animal species or rare natural communities within the study area boundary. A total of 11 special-status animal species occurrences have been documented in the larger surrounding nine USGS quandrangle search area. Of the 11 special-status animal species, four are state- and/or federally-listed as threatened or endangered, including the valley elderberry longhorn beetle *(Desmocerus californicus dimorphus)*, spring-run Chinook salmon (*Oncorhynchus tshawytscha*), northern spotted owl *(Strix occidentalis caurina)* and California red-legged frog. Two additional species are state-listed as a candidate for listing including Pacific fisher *(Martes pennanti)* and Townsend's big-eared bat *(Corynorhinus townsendii)*. No rare natural communities have been documented in the CNDDB within the nine USGS quandrangle search area.

Wildlife / Fisheries Survey

Several special-status animal species were observed during the 2013 field surveys. A list of all faunal species observed during field surveys is included in Appendix C.

One federally-listed species, rainbow trout / steelhead (*Oncorhynchus mykiss*), was observed on several occasions during field surveys. Several species designated as Species of Special Concern by DFW were also observed or detected during field surveys including foothill yellow-legged frog *(Rana boylii)*, western pond turtle *(Emys marmorata)*, pallid bat *(Antrozous pallidus)*, Townsend's big-eared bat 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. A list of all faunal species observed during field surveys is included in Appendix C.

Natural Communities

Riparian habitat is present along the banks of the South Fork of Cottonwood Creek within the project site. The habitat varies from a continuous corridor in low-gradient reaches of the creek to sparse and discontinuous in higher gradient reaches. Due to the elevation of the site, these habitats do not likely fit well with the CNDDB Great Valley Mixed Riparian Forest and Great Valley Willow Scrub rare natural communities. However, all riparian habitats are generally considered rare and extremely valuable wildlife habitats.

The project reach of the South Fork of Cottonwood Creek could probably be classified under several CNDDB rare natural communities including Central Valley Drainage Hardhead/Squawfish Stream, Central Valley Drainage Resident Rainbow Trout Stream and Central Valley Drainage Spring-run Chinook Stream.

The emergent wetland habitat associated with the small constructed storage pond could be classified as the CNDDB rare community Coastal and Valley Freshwater Marsh.

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 as well as an evaluation of potential impacts to the species from the project.

Amphibians and Reptiles

Western Pond Turtle (*Emys marmorata*)
The western pond turtle is designated as a DFW 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 the South Fork of Cottonwood Creek and the storage pond provide favorable habitat for this species. Adult and juvenile turtles were observed during field surveys in both of these habitats. **Potentially significant impacts could occur if western pond turtles were present within the study area and were harmed or killed by 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 DFW

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).

Potential habitat for this species is present within the study area. Marginal habitat is present in the South Fork of Cottonwood Creek due to the generally high gradient of the stream and lack of emergent wetland backwater or other pond-type habitats. The emergent wetland habitat associated with the storage pond represents higher quality potential habitat, however the habitat is somewhat marginal due to the presence of bass *(Micropterus sp.)* and bluegill *(Lepomis macrochirus)*. The project site is not located within designated Critical Habitat but is located within a core recovery area (Cottonwood Creek) identified in the recovery plan for this species (USFWS 2002). A detection of this species within approximately eight miles of the project site is reported in the CNDDB from the 1980s (DFW 2013a), however subsequent surveys have failed to detect them (Fellers 2007) and there are questions as to whether this observation may have been mistaken for the foothill yellow-legged frog (J. Karuzas pers comm.). No individuals were observed during several protocol-level surveys conducted by TES, however full protocol-level surveys have not been conducted. **Because potential habitat is present and full protocol-level surveys have not been completed, the potential presence of this species can not be discounted. Potentially significant impacts to this species could occur if California red-legged frog were present within the study area and were harmed or killed by construction activities or otherwise negatively impacted by the project.**

Foothill Yellow-legged Frog (*Rana boylii*)
The foothill yellow-legged frog is designated as a DFW 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 habitat for this species. During field surveys, numerous foothill yellow-legged frogs were observed in all aquatic habitats with the exception of the storage pond. The absence of observations in the pond may be due to the presence of bass and bluegill. **Potentially significant impacts could occur if foothill yellow-legged frogs were present within the study area and were harmed or killed by construction activities.**

Birds

Golden Eagle (*Aquila chrysaetos*)
The golden eagle is designated as a Fully Protected Species under the California Fish and Game Code. 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. Its diet consists mostly of lagomorphs (rabbits and hares) and rodents, but also includes other mammals, reptiles, birds, and some carrion (Zeiner et al. 1990a).

It is unlikely that golden eagles would nest within the study area due to the lack of cliffs or rock outcroppings. No golden eagles were observed during field surveys, however it is likely that golden eagles are present at various times of the year foraging or roosting within, or near, the study area. Potential impacts to golden eagle foraging activities could occur during construction activities, however impacts to foraging from construction activities would typically not be considered a significant impact because of the temporary nature and short duration. **No significant impacts to golden eagles are anticipated as a result of the proposed project.**

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

There is a lack of suitable nesting and roosting habitat within the study area due to the lack of large hollow trees. No Vaux's swifts were observed during field surveys. Potential foraging habitat is present within the study area, however impacts to foraging from construction activities would typically not be considered a significant impact because of the temporary nature and short duration. **No significant impacts to Vaux's swift are anticipated as a result of the proposed project.**

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

There is a lack of nesting habitat within the study area due to the lack of cliffs or waterfalls. No black swifts were observed during field surveys. Potential foraging habitat is present within the study area, however impacts to foraging from construction activities would typically not be considered a significant impact because of the temporary nature and short duration. **No significant impacts to black swift are anticipated as a result of the proposed project.**

Yellow Warbler (*Dendroica petechia brewsteri*)
The yellow warbler is designated as a DFW Species of Special Concern. Threats to the species include destruction of riparian habitat and nest parasitism by brown-headed cowbirds (*Molothrus ater*) (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 forage on insects, spiders and occasionally berries (Zeiner et al. 1990a).

Little Willow Flycatcher (*Empidonax traillii brewsteri*)
The little willow flycatcher, a subspecies of willow flycatcher (*Empidonax traillii*), 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 (DFG 2005). They nest in dense willow thickets in upper elevations near rivers, streams and lakes (Zeiner et al. 1990a).

Little willow flycatchers are not likely to nest within the study area due to the fact that the project area is not within the known breeding range of the species (Zeiner et al. 1990a). No little willow flycatchers were observed during field surveys, however foraging is likely to occur within the study area during times when little willow flycatchers migrate through the area. Impacts to foraging from construction activities would typically not be considered a significant impact because of the temporary nature and short duration. **No significant impacts to little willow flycatchers are anticipated as a result of the proposed project.**

American Peregrine Falcon *(Falco peregrinus anatum)*
The American peregrine falcon is designated as a Fully Protected species under the California Fish and Game Code. The species was previously listed as Endangered by the State of California but was delisted in 2009. The species was originally listed as Endangered by the USFWS but 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 yearlong habitats, 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 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. No American peregrine falcons were observed during field surveys. Potential foraging habitat is present within the study area, however impacts to foraging from construction activities would typically not be considered a significant impact because of the temporary nature and short duration. **No significant impacts to American peregrine falcons are anticipated as a result of the proposed project.**

Bald Eagle (*Haliaeetus leucocephalus*)
The 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. The species was originally listed as Endangered by the USFWS in 1967, was downlisted to Threatened in 1995, and delisted in 2007. Past declines in 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 (DFW 2005). Recovery efforts have focused on the protection of nesting areas and restrictions on the use of DDT. The 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 (DFW 2005).

It is unlikely that bald eagles would nest within the study area due to the lack of established nesting structures. No bald eagle nesting activity is known to occur in the general area. No bald eagles were observed during field surveys, however it is likely that bald eagles are present at various times of the year foraging or roosting within, or near, the study area. Potential impacts to bald eagle foraging activities could occur during construction activities, however impacts to foraging from construction activities

would typically not be considered a significant impact because of the temporary nature and short duration. **No significant impacts to bald eagles are anticipated as a result of the proposed project.**

Yellow-breasted Chat (*Icteria virens*)
The yellow-breasted chat is designated as a DFW 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).

No yellow-breasted chats were observed during field surveys, however potential nesting and foraging habitat is present in riparian habitat within the study area. **Potential impacts could occur if active yellow-breasted chat nests were present during construction, and construction activities caused nests to be abandoned.**

Loggerhead Shrike *(Lanius ludovicianus)*
The loggerhead shrike is designated as a DFW Species of Special Concern. Potential threats and reasons for population declines are not well-documented for this 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, 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).

No loggerhead shrikes were observed during field surveys, however potential nesting and foraging habitat is present in riparian and upland habitats within the study area. **Potential impacts could occur if active loggerhead shrike nests were present during construction, and construction activities caused nests to be abandoned.**

Purple Martin *(Progne subis)*
The purple martin is designated as a DFW Species of Special Concern. Declines in purple martin populations have been attributed to the loss of nesting habitat due to competition for nest cavities with the non-native European starling *(Sturnus vulgaris)* and house sparrow *(Passer domesticus),* as well as the removal of snags and riparian habitat (Remsen 1978, Zeiner et al. 1990a). Purple martins are a neotropical migrant species that nest in cavities in tall, large trees, bridges, utility poles, lava tubes and buildings, with low canopy cover near the nest height (<20% within 100 meters) (Shuford and Gardali 2008). Nesting occurs from April into August in valley foothill and montane hardwood, hardwood-conifer, and riparian habitats, as well as closed-cone pine-cypress, ponderosa pine, Douglas fir and redwood habitats (Zeiner et al. 1990a). They feed primarily on large insects, such as dragonflies, primarily hawking them in flight, but will occasionally forage on the ground in riparian areas, forests and woodlands.

There is a lack of nesting habitat for this species within the study area due to the low elevation of the site and the lack of large hollow trees. No little loggerhead shrikes were observed during field surveys Foraging habitat is present within the study area during times when purple martin may migrate through the area, however impacts to foraging from construction activities would typically not be considered a significant impact because of the temporary nature and short duration. **No significant impacts to purple martin are anticipated as a result of the proposed project.**

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 field surveys. A number of additional raptor species, while not observed, may potentially nest within, or near the project site. Several 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 during construction, and 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 by DFW 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 construction activities or if construction activities caused nesting migratory birds to abandon active nests.**

FISH

Hardhead (*Mylopharadon conocephalus*)

The hardhead is a DFW 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 the South Fork of Cottonwood Creek (Richardson et al. 1978). The purpose of the 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.

O. mykiss were observed at the project site during field surveys and Central Valley steelhead are known to occur in the South Fork of Cottonwood Creek (Richardson et al. 1978). The purpose of the project is to improve passage conditions 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 construction activities, or otherwise negatively impacted by the project.**

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 stream flows and blocked access to upper elevation headwaters due to dams. Spring-run Chinook salmon are thought, by some, to once have been the most abundant run of salmon in the Central Valley. This run 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.

Central Valley spring-run Chinook salmon are known to have occurred in the South Fork of Cottonwood Creek in some years (Richardson et al. 1978) and are assumed to have the potential to occur in the project reach of the South Fork of Cottonwood Creek (Bratcher 2013). The purpose of the 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, or otherwise negatively impacted by the project.**

Mammals

Pallid Bat (*Antrozous pallidus*)
The pallid bat is designated as a DFW Species of Special Concern. Threats to this 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 foraging within the study area during field surveys and may be roosting in outbuildings or in the diversion tunnel within the study area. No alterations to any of the outbuildings is proposed as part of the project. **While no significant alterations to the diversion tunnel are proposed as part of the project, potential impacts could occur if pallid bats were using the tunnel for maternity activities or as a winter roost and construction activities disturbed these activities.**

Ringtail (*Bassariscus astutus*)
The ringtail is designated as a Fully Protected species under the California Fish and Game Code. Threats to this 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 and outbuildings. The project would not directly impact potential ringtail denning, nesting or foraging habitat. **Because no direct impacts to potential denning, nesting or foraging**

habitat would occur, no significant impacts to ringtail are anticipated as a result of the proposed project.

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 they can become habituated to reoccurring and predictable human activity (DFW 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).

Several Townsend's big-eared bats were observed day-roosting in small domes within the diversion tunnel. **While no significant alterations to the diversion tunnel are proposed as part of the project, potential impacts could occur if Townsend's big-eared bats were using the tunnel for maternity activities or as a winter roost and construction activities disturbed these activities.**

Western Red Bat (*Lasiurus blossevillii*)
The western red bat is designated as a DFW 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 detected foraging within the study area during field surveys and are likely roosting in riparian habitats within the study area. No direct impacts to riparian habitats will occur as a result of the project. Short-term impacts could occur if western red bats were roosting in close proximity to construction activities, specifically during blasting operations. However, these impacts would not be considered significant because of the temporary nature and short duration. **No significant impacts to the western red bat are anticipated from the proposed project.**

Pacific Fisher (*Martes pennanti*)
The Pacific fisher was listed as a Candidate for listing as Endangered or Threatened by the State of California on March 11, 2013. The Pacific fisher Distinct Population Segment (DPS) is also designated by the USFWS as a Candidate for listing as Endangered or Threatened. Threats to this species include fragmentation of forested habitat and loss of structural complexity, riparian habitat and late-seral trees. In the western U.S., this medium-sized carnivore inhabits areas with high canopy closure, typically late-successional coniferous forest, without frequent, deep fluffy snow (Bolster et al. 1998). They rest and den in protected cavities and brush piles. They range in elevation from near sea level to over 11,000 feet (Williams 1986). Pacific fishers are generally more common in areas of low human density and low human disturbance (Ruggiero et al. 1994). Natal denning occurs in the spring in cavities near the tops of live trees and snags (Bolster et al. 1998). They prey on a variety of small and medium-sized mammals and birds, as well as carrion (Bolster et al. 1998).

Denning or resting habitat for Pacific fishers is limited within the project site due to the lack of large hollow trees and down logs. There is a potential that Pacific fishers may utilize the study area, particularly riparian corridors for foraging and as migratory pathways. Pacific fishers have been detected in the mid-1990s north of the study area, at similar elevations (P. Bratcher pers. comm.). The project would not directly impact potential Pacific fisher denning, nesting or foraging habitat. **Because no direct impacts to potential denning, nesting or foraging habitat would occur, no significant impacts to Pacific fisher are anticipated as a result of the proposed project.**

Natural Communities

None of the riparian habitats identified as CNDDB rare communities will be directly impacted by the project. Some indirect changes to the riparian habitats upstream of the diversion dam may occur over time as the stream channel adjusts following the dam removal, however this is difficult, if not impossible to predict as the depth of bedrock control is not known.

The stream habitats will be positively affected by the removal of the diversion dam and the decrease in the amount of water diverted from the creek. The purpose of the project is to improve fish passage conditions to provide access to stream habitats that may not be accessible due to the presence of the diversion dam. Improving fish passage at this site (river mile 43.85) will enable anadromous fish access to an additional five miles of stream habitat.

A preliminary wetland delineation was conducted (Tehama Environmental Solutions, Inc. 2013) 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 1602 of the California Fish and Game Code. Any impacts to these potentially jurisdictional features will be addressed during the regulatory permit process.

CONCLUSIONS AND RECOMMENDED AVOIDANCE AND MINIMIZATION MEASURES

Listed and Candidate Species

Seven federally- and/or state-listed animal species have the potential to occur within the study area, including the California red-legged frog, little willow flycatcher, bald eagle, Central Valley steelhead, Central Valley spring-run Chinook salmon, Townsend's big-eared bat and Pacific fisher. Of these seven species, four may be potentially impacted by the project (California red-legged frog, Central Valley steelhead, Central Valley spring-run Chinook salmon and Townsend's big-eared bat). Recommended avoidance and minimization measures are provided for these four species below.

<u>California Red-legged Frog</u>

- The USFWS 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.

<u>Central Valley Steelhead and Central Valley Spring-run Chinook Salmon</u>

- All in-stream work should be conducted between June 15 and October 1 to minimize impacts to anadromous fish by working when anadromous fish are less likely to be present due to warmer water temperatures.

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

- Care should be taken to ensure that wet concrete does not enter the South Fork of Cottonwood Creek during the construction of the fish screen structure.

- USFWS, in coordination and consultation with NMFS and DFW, will ensure that qualified fish biologists are onsite to implement fish rescue operations through the use of seining or electrofishing, if necessary, prior to in-stream construction activities. Best professional determination will be used to decide which method of rescue is most appropriate. 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.

Townsend's Big-eared Bat

- Prior to any construction work in the diversion tunnel, a survey should be conducted by an experienced bat biologist to ensure that Townsend's big-eared bats are not present in the tunnel.

- If Townsend's big-eared bats are found to be present in the diversion tunnel, construction activities in the tunnel should be suspended until a qualified biologist, in consultation with DFW, can establish appropriate measures to minimize impacts to roosting bats.

Species of Special Concern

Seven species designated by the DFW as Species of Special Concern could potentially be significantly affected by implementation of the project. Recommended avoidance and minimization measures are provided for these seven species below.

Western Pond Turtle and Foothill Yellow-legged Frog

- Prior to in-stream work, dam removal and any dewatering/water diversion activities, surveys for western pond turtle and foothill yellow-legged frog should be conducted within the project footprint. Any western pond turtles or foothill yellow-legged frogs should be captured and relocated to suitable habitat areas outside of the construction area.

Yellow Warbler, Yellow-breasted Chat and 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 DFW, 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.

Hardhead
The avoidance and minimization measures identified for Central Valley steelhead and Central Valley spring-run Chinook salmon will adequately mitigate for any potential impacts to hardhead.

Pallid Bat
The avoidance and minimization measures identified for Townsend's big-eared bat will adequately mitigate for any potential impacts to pallid bat.

Other Nesting Raptors and Migratory Birds

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

Other Nesting Raptors

- Any tree removal, vegetation clearing, or the onset of potentially disturbing construction activities should occur between September 1 and February 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 DFW, 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.

Other Nesting Migratory Birds
The avoidance and minimization measures identified for yellow warbler, yellow-breasted chat 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 project on rare natural communities:

Riparian Habitat

- Disturbing riparian habitat that is present within the study area associated with the South Fork of Cottonwood Creek should be avoided, if possible. If disturbance cannot be avoided, appropriate avoidance and minimization measures will need to be developed during the environmental permit processes with DFW and other regulatory agencies.

Wetlands and Other Waters of the U.S / State

- Because implementation of the project 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 DFW will not be required.

With incorporation of these avoidance and minimization measures, no significant impacts to state- or federally-listed faunal species (with the exception of Central Valley steelhead), special-status faunal species or rare natural communities are expected to occur as a result of the proposed project. An unavoidable "may affect, likely to adversely affect" determination is anticipated for Central Valley steelhead. This will 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
Hammer Diversion on South Fork Cottonwood Creek Fish Passage Improvement Project

COMMON NAME	SCIENTIFIC NAME	USGS 7.5' QUADRANGLE								
		RARI	COFO	TOMO	SOYB	BAMO	RIRI	PASK	LOWR	OXBR
FAUNAL SPECIES										
Townsend's Big-eared Bat	*Corynorhinus townsendii*			X						
Yellow Warbler	*Dendroica petechia brewsteri*	X							X	
Valley Elderberry Longhorn Beetle	*Desmocerus californicus dimorphus*							X		
Western Pond Turtle	*Emys marmorata*		X							
Prairie Falcon	*Falco mexicanus*						X	X		
Humboldt Marten	*Martes americana humboldtensis*			X	X					
Fisher - West Coast DPS	*Martes pennanti*	X								
Chinook Salmon - Central Valley Spring-run ESU	*Oncorhynchus tshawytscha*		X							
Foothill Yellow-legged Frog	*Rana boylii*		X			X			X	
California Red-legged Frog	*Rana draytonii*								X	
Northern Spotted Owl	*Strix occidentalis caurina*	X		X	X	X	X			
American Badger	*Taxidea taxus*				X	X				

LEGEND:

RARI = Raglin Ridge
COFO = Cold Fork
TOMO = Tomhead Mountain
SOYB = South Yolla Bolly
BAMO = Ball Mountain
RIRI = Riley Ridge
PASK = Paskenta
LOWR = Lowry
OXBR = Oxbow Bridge

APPENDIX B

Potentially-occurring Special-status Species

APPENDIX B
Potentially-occurring Special-status Species
Hammer Diversion on South Fork Cottonwood Creek Fish Passage Improvement Project

SPECIES	LISTING STATUS		TYPICAL HABITAT	POTENTIAL FOR OCCURRENCE
Common Name (*Scientific Name*)	Federal	State		
AMPHIBIANS & REPTILES				
Western Tailed Frog *(Ascaphus truei)*	---	CSC	Perennial montane streams in steep-walled valleys with dense vegetation. Tadpoles require cool streams with less than 15 degrees C.	Not likely to occur at the project site due to a lack of consistently cold water.
Western Pond Turtle *Emys marmorata)*	---	CSC	In or near aquatic habitats in slow moving water. Often associated with basking substrate (eg. logs, large rocks, etc.) Use adjacent uplands to nest and overwinter.	Observed during site surveys.
California Red-legged Frog *(Rana draytonii)*	T	CSC	Slow moving or pooled aquatic habitats with overhanging vegetation.	Potential habitat present within the project site. Not observed during site surveys.
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.
BIRDS				
Northern Goshawk (*Accipiter gentilis*)	---	CSC	Dense mature conifer and deciduous forest interspersed with open spaces and riparian areas. Nests on north-facing slopes with high tree canopy cover near water.	Not likely to occur due to a lack of suitable habitat.
Tri-colored Blackbird *(Agelaius tricolor)*	---	CSC	Breeds in tall emergent vegetation. Forages in grassland, agricultural lands.	Not likely to occur due to a lack of suitable habitat.
Golden Eagle *(Aquila chrysaetos)*	---	FP	Uses rolling foothills and mountain terrain, wide arid plateaus deeply cut by streams and canyons, open mountain slopes, and cliffs and rock outcrops. Generally inhabit more open country.	Suitable nesting habitat not present within the project site. Low to moderate likelihood of foraging in the area due to a minimal amount of preferred open terrain.
Short-eared Owl *(Asio flammeus)*	---	CSC	Uses open areas with few trees including grasslands, prairies, dunes, meadows, irrigated areas and emergent wetlands.	Not likely to occur due to a lack of suitable habitat.
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.	Not likely to occur due to a lack of suitable habitat (open foraging habitat).

APPENDIX B
Potentially-occurring Special-status Species
Hammer Diversion on South Fork Cottonwood Creek Fish Passage Improvement Project

SPECIES	LISTING STATUS		TYPICAL HABITAT	POTENTIAL FOR OCCURRENCE
Common Name (*Scientific Name*)	Federal	State		
Swainson's Hawk (*Buteo swainsoni)*	---	T	Open desert, grassland or cropland containing scattered large trees or small groves. Nests in open riparian habitat in scattered trees or small groves in sparsely vegetated flatlands.	Not likely to occur due to a lack of suitable nesting or foraging habitat. Project site is located outside of the known geographic range of the species.
Vaux's Swift *(Chaetura vauxi)*	---	CSC	Nests in large hollow trees and snags in redwood, Douglas fir and other conifer habitats. Often nests in large colonies. Forages widely, but prefers rivers and lakes.	No suitable nesting habitat present. May forage within the project area, particularly during spring and fall migration periods.
Northern Harrier *(Circus cyaneus)*	---	CSC	Open grassland, rangeland, meadow and emergent wetland.	Not likely to occur due to a lack of suitable nesting or foraging habitat.
Black Swift *(Cypseloides niger)*	---	CSC	Breeds in small colonies on cliffs behind or adjacent to waterfalls in deep canyons and sea-bluffs above surf. Forages widely.	No suitable nesting habitat present. May forage within the project area, particularly during spring and fall migration periods.
Yellow Warbler *(Dendroica petechia brewsteri)*	---	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.
White-tailed Kite *(Elanus caeruleus)*	---	FP	Nests in dense tree stands near open foraging areas. Forages in open grassland and agricultural areas.	Not likely to occur due to a lack of suitable habitat.
Little Willow Flycatcher *(Empidonax traillii brewsteri)*	---	E	Nests in upper elevation riparian and wet meadow habitats.	Low to moderate likelihood of nesting due to the fact that this species is no longer known to nest in lower elevations. Likely to forage in the 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.	No suitable nesting habitat present within the project site. May forage within the project area if nesting habitat is present in the general area.
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.	Not likely to nest in the near vicinity of the project site. No large platform nests observed during site surveys. May forage along the South Fork of Cottonwood Creek.

APPENDIX B
Potentially-occurring Special-status Species
Hammer Diversion on South Fork Cottonwood Creek Fish Passage Improvement Project

SPECIES	LISTING STATUS		TYPICAL HABITAT	POTENTIAL FOR OCCURRENCE
Common Name (*Scientific Name*)	Federal	State		
Yellow-breasted Chat *(Icteria virens)*	---	CSC	Nests in dense shrubs along streams and rivers.	May nest and forage in riparian habitats within the protect site.
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.	May nest and forage in the project area.
Purple Martin (*Progne subis*)	---	CSC	Found in open forest and woodlands with snags. Forages over riparian area, forest and woodlands.	Not likely to nest due to a lack of suitable nesting habitat. May forage in the project area if nesting habitat is present in the region.
Bank Swallow *(Riparia riparia)*	---	T	Nests in excavated burrows in fine-textured vertical stream banks.	Not likely to occur due to a lack of suitable nesting habitat.
Northern Spotted Owl (*Strix occidentalis caurina)*	T	C	Occurs in mature second growth and late-successional forest, uses dense multi-layered canopy cover for roost selection.	Not likely to occur due to a lack of suitable habitat.
FISH				
Green Sturgeon (Southern DPS) (*Acipenser medirostris*)	T	CSC	Requires cool fresh water 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 in the Cottonwood Creek drainage.
River Lamprey *(Lampetra ayresii)*		CSC	Adults spawn in gravelly riffles in river tributary streams. Ammocoetes (young) use silty backwaters and eddies.	Not known to occur in the Cottonwood Creek drainage but the species is not well studied.
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 in the South Fork of Cottonwood Creek.
Central Valley Steelhead *(Oncorhynchus mykiss)*	T	---	Spawns in cool, clear water with clean spawning gravel in the Sacramento River and many tributaries.	Rainbow trout observed during site surveys. Known to occur in the South Fork of Cottonwood Creek.

APPENDIX B
Potentially-occurring Special-status Species
Hammer Diversion on South Fork Cottonwood Creek Fish Passage Improvement Project

SPECIES	LISTING STATUS		TYPICAL HABITAT	POTENTIAL FOR OCCURRENCE
Common Name (*Scientific Name*)	Federal	State		
Central Valley Fall- / Late Fall-run Chinook Salmon *(Oncorhynchus tshawytscha)*	SC	CSC	Spawn in cool, clear water with clean spawning gravel in the Sacramento River and many tributaries.	Not likely to occur in the project reach of the South Fork of Cottonwood Creek due to the elevation of the site and low flows during spawning periods. Known to occur in the main stem of Cottonwood Creek and, in some years, in the lower reaches of the South Fork of Cottonwood Creek.
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.	Likely to occur in the project reach of the South Fork of Cottonwood Creek.
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.	Not known and not likely to occur in the South Fork of Cottonwood Creek.
INVERTEBRATES				
Vernal Pool Fairy Shrimp *(Branchinecta lynchi)*	T	---	Vernal pool and vernal pool-like habitats.	No potential for occurrence due to the lack of vernal pool habitats.
Valley Elderberry Longhorn Beetle *(Desmocerus californicus dimorphus)*	T	---	Elderberry shrubs with stems 1 inch or greater in diameter.	No potential for occurrence due to the lack of elderberry shrubs within the project site.
Vernal Pool Tadpole Shrimp *(Lepidurus packardi)*	E	---	Vernal pool and ephemeral wetland habitats.	No potential for occurrence due to the lack of vernal pool habitats.
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.
Ringtail *(Bassariscus astutus)*	---	FP	Riparian habitats and forest and shrub habitats near rocky areas or riparian areas from low to middle elevations.	Likely to occur in riparian and upland habitats or in buildings within the project site.

APPENDIX B
Potentially-occurring Special-status Species
Hammer Diversion on South Fork Cottonwood Creek Fish Passage Improvement Project

SPECIES	LISTING STATUS		TYPICAL HABITAT	POTENTIAL FOR OCCURRENCE
Common Name (*Scientific Name*)	Federal	State		
Townsend's Big-eared Bat *(Corynorhinus townsendii)*	---	C	Roosts in caves, mines, tunnels and buildings. Very sensitive to human disturbance.	Two individuals observed roosting in the diversion tunnel during site surveys.
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.	Not likely to occur. The project site is outside of the known geographic range of the species. Suitable roosting habitat not present within the project site.
Western Mastiff Bat *(Eumops perotis)*	---	CSC	Roosts in crevices in cliff faces, high buildings, trees and tunnels. Occurs in open arid to semi-arid habitats with abundant roost sites.	Not likely to occur. The project site is outside of the known geographic range of the species. Suitable roosting habitat not present within the project site.
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.
American Marten *(Martes americana)*	---	CSC	Uses cavities in large trees, snags, stumps and logs for denning. Requires a variety of different age stands, particularly mature conifers and snags. Small clearings, meadows and riparian areas provide foraging habitat.	Not likely to occur due to the lack of suitable conifer habitat.
Pacific Fisher *(Martes pennanti pacifica)*	C	C	Large areas of mature, dense coniferous forest and riparian forest stands with snags and high percent canopy cover.	Low to moderate likelihood of occurrence. The project site lacks preferred confer habitat, however animals may migrate downslope from coniferous habitat and occupy the project area, particularly during winter months.

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
Hammer Diversion on South Fork Cottonwood Creek
Fish Passage Improvement Project

COMMON NAME	SCIENTIFIC NAME	LISTING STATUS	
		Federal	State
AMPHIBIANS & REPTILES			
Common King Snake	*Lampropeltis getula*		
Foothill Yellow-legged Frog	*Rana boylii*		CSC
Gopher Snake	*Pituophis melanoleucus*		
Oregon Garter Snake	*Thamnophis atratus hydrophilus*		
Pacific Chorus Frog	*Pseudacris regilla*		
Western Fence Lizard	*Sceloporus occidentalis*		
Western Pond Turtle	*Emys marmarata*		CSC
Western Rattlesnake	*Crotalus viridis*		
Western Skink	*Eumeces skiltonianus*		
Western Toad	*Bufo boreas*		
BIRDS			
American Dipper	*Cinclus mexicanus*		
American Robin	*Turdus migratorius*		
Anna's Hummingbird	*Calypte anna*		
Band-tailed Pigeon	*Patagioenas fasciata*		
Bewick's Wren	*Thryomanes bewickii*		
Black Phoebe	*Sayornis nigricans*		
Black-headed Grosbeak	*Pheucticus melanocephalus*		
Bullock's Oriole	*Icterus bullockii*		
Bushtit	*Psaltriparus minimus*		
California Quail	*Callipepla californica*		
Common Merganser	*Mergus merganser*		
Lazuli Bunting	*Passerina amoena*		
Mountain Quail	*Oreortyx pictus*		
Mourning Dove	*Zenaida macroura*		
Northern Flicker	*Calaptes auratus*		
Nuttall's Woodpecker	*Picoides nuttallii*		
Red-shouldered Hawk	*Buteo lineatus*		
Red-tailed Hawk	*Buteo jamaicensis*		
Spotted Towhee	*Pipilo maculatus*		
Steller's Jay	*Cyanocitta stelleri*		
Warbling Vireo	*Vireo gilvus*		
Western Scrub-Jay	*Aphelocoma californica*		
Western Tanager	*Piranga ludoviciana*		
Wrentit	*Chamaea fasciata*		
FISH			
Bass*	*Micropterus sp.*		
Bluegill*	*Lepomis macrochirus*		
Rainbow Trout (Steelhead)	*Oncorhynchus mykiss*	T	
Sacramento Sucker	*Catostomus occidentalis*		

APPENDIX C
Faunal Species Observed Within or Near the Project Site
Hammer Diversion on South Fork Cottonwood Creek
Fish Passage Improvement Project

COMMON NAME	SCIENTIFIC NAME	LISTING STATUS	
		Federal	State
INVERTEBRATES			
Crayfish	*Unknown species*		
MAMMALS			
American Beaver (sign)	*Castor canadensis*		
Big Brown Bat	*Eptesicus fuscus*		
Black Bear (tracks, scat)	*Ursus americanus*		
Black-tailed Jackrabbit	*Lepus californicus*		
California Ground Squirrel	*Spermophilus beecheyi*		
California Bat	*Myotis californicus*		
Canyon Bat	*Parastrellus hesperus*		
Brazilian Free-tailed Bat	*Tadarida brasiliensis*		
Fringed Bat	*Myotis thysanodes*		
Long-legged Bat	*Myotis volans*		
Hoary Bat	*Lasiurus cinereus*		
Little Brown Bat	*Myotis lucifugus*		
Long-eared Bat	*Myotis evotis*		
Mule Deer (Black-tailed Deer)	*Odocoileus hemionus columbianus*		
Pallid Bat	*Antrozous pallidus*		CSC
Silver-haired Bat	*Lasionycteris noctivagans*		
Small-footed Bat	*Myotis ciliolabrum*		
Townsend's Big-eared Bat	*Corynorhinus townsendii*		C
Western Gray Squirrel	*Sciurus griseus*		
Western Red Bat	*Lasiurus blossevillii*		CSC
Yuma Bat	*Myotis yumanensis*		

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CSC = California Species of Special Concern
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SC = NMFS Species of Concern
D = Delisted
PD = Proposed for Delisting
***** = Non-native Species

APPENDIX D

Site Photos

Photo 1. View of the Hammer diversion, looking southwest. Photo date: August 9, 2013.

Photo 2. View of the area downstream of the Hammer diversion, looking northwest. Photo date: August 9, 2013.

Photo 3. View of non-functional existing fish ladder on Hammer Dam. Photo date: August 9, 2013.

Photo 4. View of suspension bridge that supports an attached 6-inch culvert that carries irrigation water from the tunnel to the ditch system, looking northwest. Photo date: August 9, 2013.

Photo 5. View inside of the water conveyance tunnel, looking northwest. Photo date: August 9, 2013.

Photo 6. View of the storage pond, looking south. Photo date: August 29, 2013.