FINAL

Environmental Assessment / Initial Study

and

Finding of No Significant Impact / Mitigated Negative Declaration

Deer Creek DCID Dam Fish Passage Project

Tehama County, California

May 2019

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List of Acronyms and Abbreviations

AG-1	Agriculture /Upland District
AQMD	Air Quality Management District
AFRP	Anadromous Fish Restoration Program
AIS	Aquatic Invasive Species
APE	Area of Potential Effect
BMP	Best Management Practice
BA	Biological Assessment
BRE	Biological Resources Evaluation
BLM	Bureau of Land Management
CALFED	CALFED Bay-Delta Program
ERPP	CALFED Bay-Delta Program Ecosystem Restoration Program Plan
CARB	California Air Resources Board
CCR	California Code of Regulations
CDFG	California Department of Fish and Game
CDFW	California Department of Fish and Wildlife
DWR	California Department of Water Resources
CESA	California Endangered Species Act
CEQA	California Environmental Quality Act
CHP	California Highway Patrol
CNPS	California Native Plant Society
CNDDB	California Natural Diversity Data Base
CO2	Carbon Dioxide
CV	Central Valley
CVPIA	Central Valley Project Improvement Act
RWQCB	Central Valley Regional Water Control Board
CFR	Code of Federal Regulation
CEQ	Council on Environmental Quality
CH	Critical Habitat
DCID	Deer Creek Irrigation District
DCWC	Deer Creek Watershed Management Plan
DDT	Dichlorodiphenyltrichloroethane
DOORS	Diesel Off-Road On-Line Reporting System
DPS	Distinct Population Segment
DSW	Disturbed Seasonal Wetlands
ERP	Ecosystem Restoration Program
ESA	Endangered Species Act
LEQ	Energy-Equivalent Level
EA	Environmental Assessment
EIR	Environmental Impact Report
EIS	Environmental Impact Study
ES	Ephemeral Stream

EFH	Essential Fish Habitat
ESU	Evolutionarily Significant Unit
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FONSI	Finding of No Significant Impact
GPS	Global Positioning System
GHG	Greenhouse Gas
LBS	Lower Barrier Site
MOU	Memorandum of Understanding
CH4	Methane
MND	Mitigated Negative Declaration
MMRP	Mitigation Monitoring and Reporting Program
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NAHC	Native American Heritage Commission
N2O	Nitrous Oxide
NFBC	North Fork Battle Creek
NSVAB	Northern Sacramento Valley Air Basin
NHC	Northwest Hydraulic Consultants, Inc.
OHWM	Ordinary High Water Mark
PM10	Particulate Matter less than 10 Microns in Diameter
PS	Perennial Stream
PERP	Portable Equipment Registration Program
PCE	Primary Constituent Element
PEIS	Programmatic Environmental Impact Statement
TAC	Project Technical Advisory Committee
RPW	Relatively Permanent Water
RPM	Resource Protection Measure
RW	Riparian Wetland
D50	Rock diameter larger than 50 percent of the rock
SVGB	Sacramento Valley Groundwater Basin
SW	Seasonal Wetland
SCAQMD	Shasta County Air Quality Management District
SCS	Soil Conservation Service
SVRIC	Stanford-Vina Ranch Irrigation Company
CA	State of California
SR	State Route
SWPPP	Stormwater Pollution Prevention Plan
STC	Sub Terra Consulting
TCAPCD	Tehama County Air Pollution Control District
APCD	Tehama County Air Pollution Control District
TES	Tehama Environmental Solutions, Inc.
TDS	Total Dissolved Solids
USBR	U.S. Bureau of Reclamation
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
EPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
USCOE	United States Army Corp of Engineers
UAV	Unmanned Aerial Vehicle
UA	Upland Agriculture
UBS	Upper Barrier Site
VELB	Valley Elderberry Longhorn Beetle
WSE	Water Surface Event
WSME	Water Surface Mapping Event
WC	Wetland Complex

Project Title:

Deer Creek DCID Dam Fish Passage Project

Lead Agencies Name and Address:

The U.S. Fish and Wildlife Service (USFWS) is the lead agency under the National Environmental Policy Act (NEPA). The Deer Creek Irrigation District (DCID) is the lead agency under the California Environmental Quality Act (CEQA). Contact information for the lead agencies are listed below:

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Project Location:

The project is located on Deer Creek, at approximately 11 river miles upstream of the confluence with the Sacramento River, east of Vina, Tehama County, California (Figure 1). Specifically, the project is located in Sections 22, 23, and 27, Township 25 North, Range 1 West, Mount Diablo Base and Meridian, within the 7.5-minute United States Geological Survey (USGS) Acorn Hollow quadrangle map (Figure 2). An aerial photo of the project area is included as Figure 3.

General Plan Designation:

The Tehama County General Plan designation for the project site is Upland Agriculture (U-A).

Zoning:

The Tehama County zoning designation within the project site is Agricultural / Upland District (AG-1).

1.0 Introduction

Overview

Under the authority of the Central Valley Project Improvement Act (CVPIA), USFWS has developed an Anadromous Fish Restoration Program (AFRP) with the broad goal of doubling natural production of anadromous fish (those that spawn in fresh water but spend their adult life in salt water) in the rivers and streams of the Central Valley. The AFRP and other ecosystem restoration programs have recommended a fish passage improvement project (hereafter referred to as project, proposed project or proposed action) on Deer Creek at the DCID diversion dam. The objective of the project is to improve upstream and downstream passage at the diversion dam for adult and juvenile salmonids and Pacific lamprey while meeting DCID's irrigation needs.

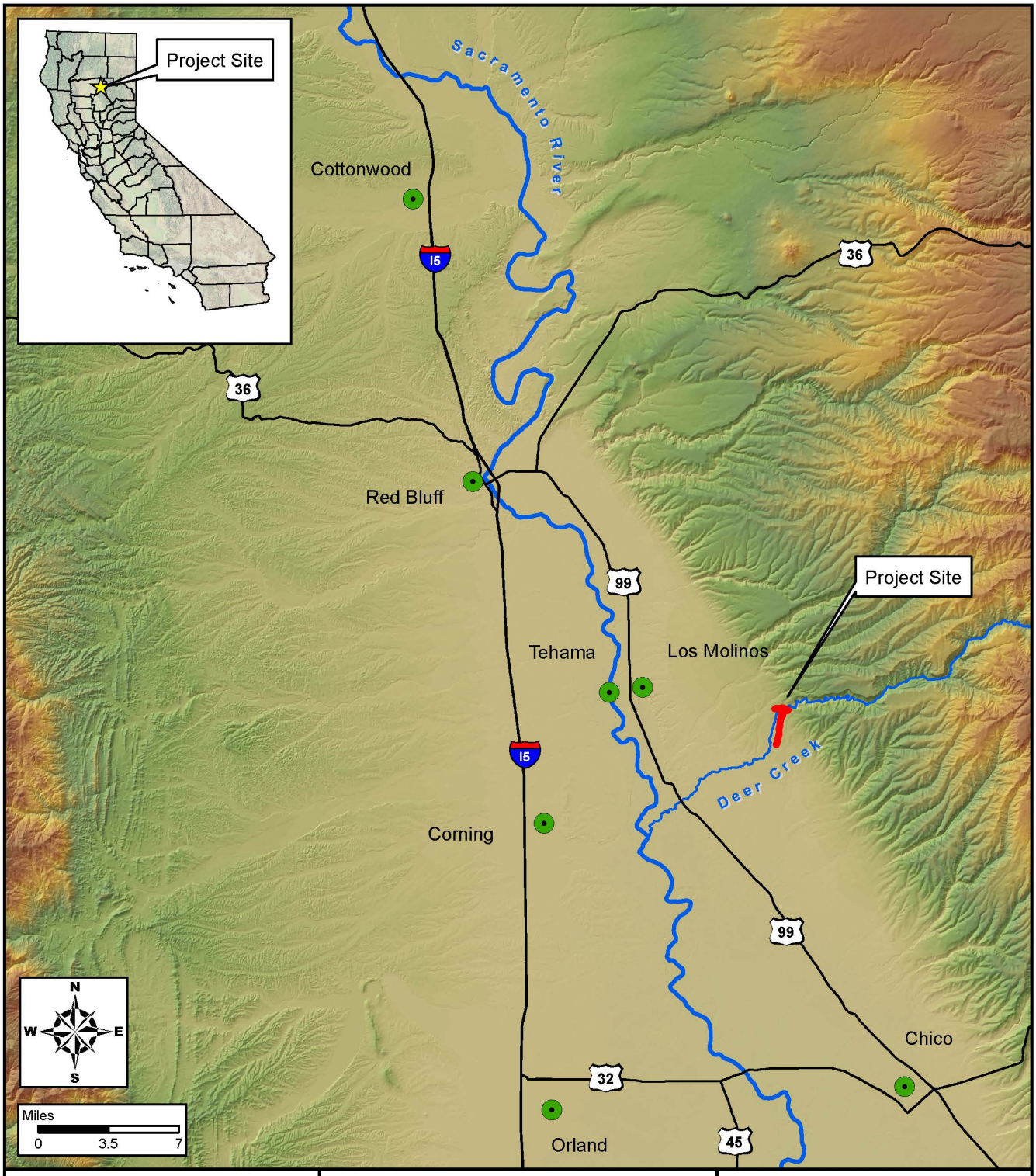
Reduced instream flows due to irrigation demands and structural damage to the apron of the DCID dam during the 1997 flood event has contributed to the difficulties of upstream migration for these important natural anadromous species. The proposed project involves constructing a roughened channel (rock ramp) spanning the entire width of the creek downstream of the existing dam, lowering approximately 1,400 feet of the existing diversion ditch, and replacing the off-channel fish screen and juvenile bypass pipe at a lower elevation. Improving fish passage at this site would improve anadromous fish access to spawning, rearing and holding stream habitat upstream of the project site through the roughened rock ramp, and would improve anadromous fish passage, downstream of the project sites through fish screen and bypass pipe modifications. The project is being implemented by Trout Unlimited and funded by USFWS through the AFRP and by the California Department of Fish and Wildlife (CDFW) through the Proposition 1 Watershed Restoration Grant Program.

Purpose of This Document

This Joint Environmental Assessment / Initial Study (EA / IS) was prepared by Tehama Environmental Solutions, Inc. (TES) under subcontract with Northwest Hydraulic Consultants (NHC) under agreement number F18AP00096 with USFWS. The EA / IS has been prepared to comply with both NEPA (42 U.S.C. 4331 *et seq.*) and CEQA (California Pub. Res. Code, Sections 21000 *et seq*.). USFWS is the lead agency under NEPA and DCID is the lead agency under CEQA.

The purpose of this EA / IS is twofold. Under NEPA, the purpose is to determine whether the proposed action would result in significant effects on the environment which would then require the preparation of an Environmental Impact Statement (EIS), or alternatively, whether the level of effects on the environment are such that a Finding of No Significant Impact (FONSI) can be supported by the federal lead agency. Similarly, under CEQA, the purpose is to determine whether the proposed project would result in significant effects on the environment which would require the preparation of an Environmental Impact Report (EIR), or alternatively, whether the level of effects on the environment are such that a Negative Declaration or a Mitigated Negative Declaration can be supported by the state lead agency.

This EA / IS describes the environmental resources in the project area, analyzes the effects of the proposed action and a No Action alternative on the environment, and proposes avoidance, minimization and / or mitigation measures to reduce any effects to less than significant levels.



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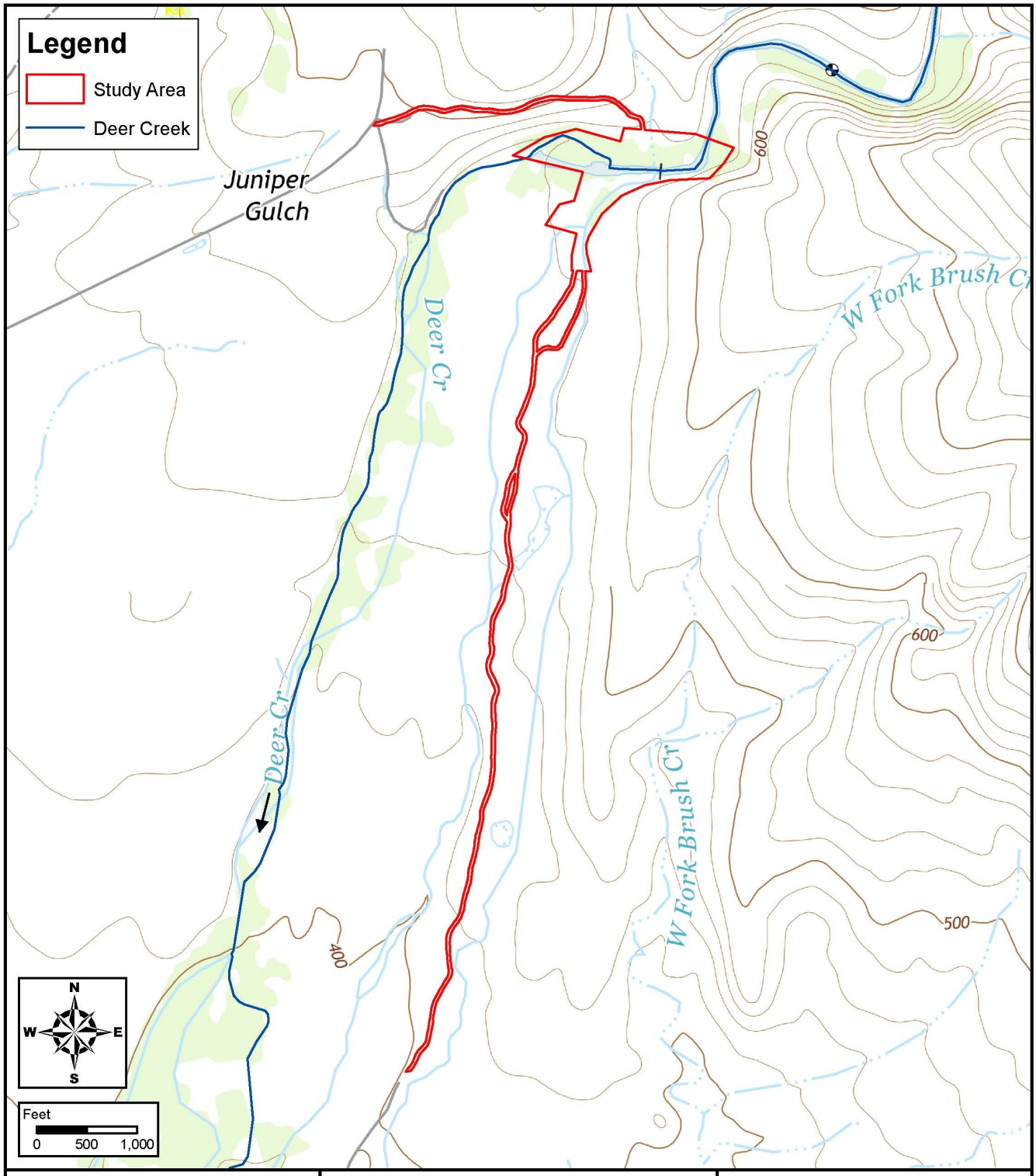
Tehama County, California

March 2019

FIGURE 1

Site Vicinity Map



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Tehama County, California

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FIGURE 2

Site Location Map

SOURCE: USGS, 7.5 Minute, California-Tehama Co., ACORN HOLLOW QUADRANGLE

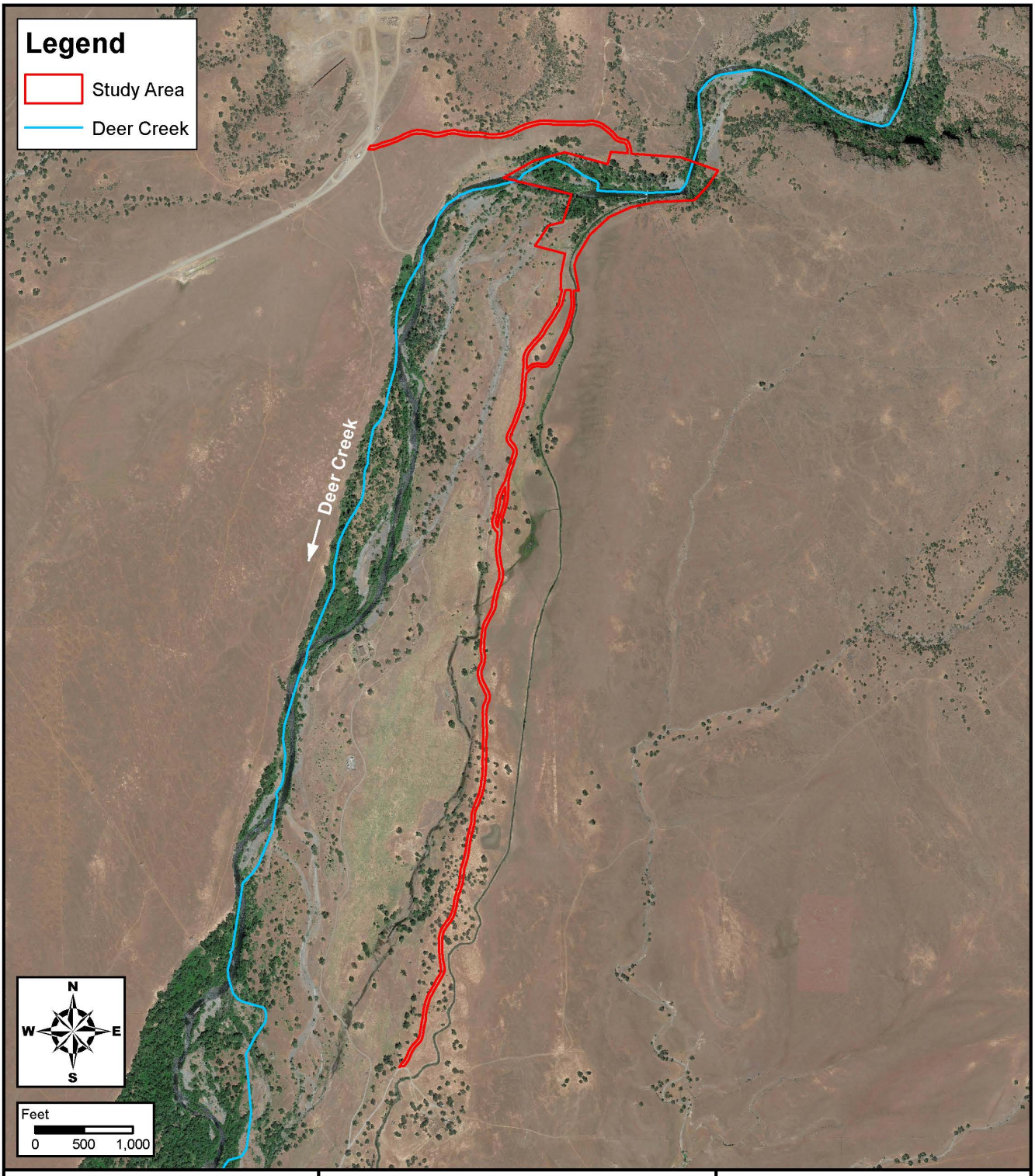

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FIGURE 3

Site Aerial Photo Map

PHOTO SOURCE: Google Earth, 5/25/2017

Figure 4. Looking upstream at the DCID diversion structure with flashboards installed. Photo taken on May 4, 2015. Instream flow approximately 86 cfs before diversion)

Figure 5. Looking upstream at the DCID diversion structure without flashboards installed. Photo taken on November 11, 2015. Instream flow is approximately 71 cfs with no diversion flow.

Figure 6. Looking south across the diversion dam at the diversion channel inlet. Flashboards and temporary CDFW fish ladder are installed. Note height of sediment relative to concrete dam. Photo taken on May 4, 2015. Instream flow is approximately 86 cfs before diversion.

Figure 7. This fall run Chinook salmon was observed struggling to pass upstream over the concrete dam with flashboards removed. After a few attempts, the salmon was observed swimming back downstream.

Figure 8. Existing DCID fish screen bay looking downstream from the headgates. The entrance to the juvenile bypass pipe is near the handrail at the far end of this photo.

Figure 9. Outlet of the juvenile bypass pipe.

Figure 10. View of the existing diversion ditch, looking east (upstream) toward the fish screen.

Figure 11. View of the high flow channel, looking east (upstream), that will serve as the temporary diversion channel to route stream flows around the project site.

Figure 12. View of the south access road to the project site, looking east.

Project Location

The project is located on Deer Creek, at approximately 11 river miles upstream of the confluence with the Sacramento River, east of Vina, Tehama County, California (Figure 1). Specifically, the project is located in Sections 22, 23, and 27, Township 25 North, Range 1 West, Mount Diablo Base and Meridian, within the 7.5-minute United States Geological Survey (USGS) Acorn Hollow quadrangle map (Figure 2). An aerial photo of the project area is included as Figure 3.

Purpose and Need for Action

NEPA regulations require the federal lead agency to describe the underlying purpose and need to which the agency is responding, when considering a project, while the CEQA Guidelines require that the state lead agency provide a "statement of objectives sought by the proposed project" (Council on Environmental Quality [CEQ] and Governor's Office of Planning and Research 2014). The information in this section addresses both of these requirements by providing information as to why USFWS and the DCID are considering the proposed project.

Purpose

The purpose of the proposed project is to improve upstream and downstream passage at the DCID diversion dam for adult and juvenile salmonids and Pacific lamprey while meeting the DCID's irrigation needs. The upgrades and modifications to the stream channel, fish screen and water diversion infrastructure would provide improved upstream and downstream passage for adult and juvenile salmonids, as well as other native species.

Need

Improving fish passage at the site is needed to enable consistent anadromous fish access to upstream spawning, rearing and holding habitat, over a wider range of flows as well as to enable unimpeded bypass for juvenile salmon and adult and juvenile steelhead during downstream migrations.

The AFRP and other ecosystem restoration programs have recommended improving fish passage in Central Valley streams as a high priority for the CVPIA. One of the High Priority Actions in the Final Restoration Plan for the Anadromous Fish Restoration Plan (U.S. Fish and Wildlife Service 2001) included "Encourage the restoration of small tributaries by evaluating the feasibility of screening or relocating diversions, switching to alternative sources of water for upstream diversions, replacing bridge and ford combinations with bridges or larger culverts and installing siphons to prevent truncation of small steams at irrigation canals." The USFWS has identified the DCID dam on Deer Creek as a potential site for improving passage conditions for several species of anadromous fish.

The DCID diversion dam was constructed in the 1920s to provide irrigation water to over 1,800 acres of farm and ranch land (California Department of Water Resources 2014). The dam consists of a concrete sill spanning a 75-foot wide low flow channel. Raised concrete abutments tie the sill into the floodplain. The DCID diversion ditch entrance is just upstream of the south abutment. On an annual and seasonal basis, DCID installs flashboards along the dam crest to increase head at the upstream end of the diversion ditch and increase diversion flows.

CDFW currently operates a removable fish ladder at the DCID dam when the flashboards are installed. The fish ladder requires flashboards to be in place and is removed with the flashboards at the end of the diversion season. Under current conditions fish are being turned back and dead-ended by the concrete dam when the flashboards and fish ladder are removed. In addition, due in part to naturally-occurring low flows, agricultural diversions, channel morphology and excessive temperatures, the upstream migration of adults or downstream migration of juvenile spring-run Chinook salmon and steelhead may be impeded or blocked in some years. These conditions have been determined to be a fish passage barrier.

The DCID diversion is a private stream diversion system that supplies irrigation water for agricultural uses. There is a continued need by the DCID for water, so the project must be designed to address this need.

As a result of the needs identified above, the objectives for this proposed project are as follows:

- Improve fish passage at the DCID diversion dam,
- Address DCID water needs, and
- Minimize maintenance needs for public agencies and DCID

Deer Creek DCID Dam Fish Passage Project Technical Advisory Committee

The project was developed through a collaborative process by a technical advisory committee (TAC) composed of representatives from DCID, USFWS, National Marine Fisheries Service (NMFS), CDFW, California Department of Water Resources (DWR), Trout Unlimited, Central Valley Regional Water Quality Control Board (RWQCB), U.S. Army Corps of Engineers (USACE), multiple private landowners and several private consulting firms.

Regulatory Framework

In addition to CEQA and NEPA, the proposed project is subject to a variety of federal, state, and local laws, regulations and policies as identified in Section 5 Compliance with Environmental Laws and Regulations of this document. The proposed project would require several federal, state, and local agency permits and approvals prior to implementation (Table 1).

Table 1. Required Permits and Approvals

Permits and Approvals	Agency
FEDERAL	
Clean Water Act Section 404 Permit	U.S. Army Corps of Engineers
Endangered Species Act Section 7 Consultation	National Marine Fisheries Service & U.S. Fish and Wildlife Service
STATE	
Clean Water Act Section 401 Water Quality Certification	Central Valley Region Water Quality Control Board
Lake or Streambed Alteration Agreement	California Department of Fish and Wildlife
California Endangered Species Act	California Department of Fish and Wildlife
Encroachment Permit or Executive Officer Delegated Permit	Central Valley Flood Protection Board
Construction General Stormwater Permit*	California State Water Resources Control Board
National Historic Preservation Act Section 106 Consultation	California State Office of Historic Preservation
National Pollutant Discharge Elimination System Dewatering And Other Low Threat Discharges To Surface Waters Permit**	Central Valley Regional Water Quality Control Board
LOCAL	
Tehama County Fugitive Dust Permit	Tehama County Air Pollution Control District
Building and Grading Permits***	Tehama County Public Works Department

***May be required if the project is determined to cause disturbance to one or more acres of soil.**
****May be required depending on the method of dewatering proposed.**
***** May be required.**

2.0 Proposed Action and Alternatives

Alternative Development

Six alternatives were evaluated and five of the six alternatives were identified as possible long-term fish passage solutions (California Department of Water Resources 2014). The alternatives were analyzed based on numerous factors including fish passage, operations and maintenance, location and condition of existing dam, stream characteristics, stream hydrology, biological criteria, owner liability, and economics.

The project was developed by the TAC as a collaborative effort with participation from many different disciplines represented by local, state and federal public and private entities. A TAC was made up of engineers, geologists, environmental scientists and landowners that were involved with the design process and instrumental with the selection of a preferred alternative.

The six alternatives that were described and discussed by the TAC included:

1. Construct a side channel around the existing dam structure.
2. Construct a step pool channel below the dam.
3. Construct a fish ladder at the dam.
4. Remove the dam and existing fish screen and construct a fish-friendly pump station.
    - 6a. Construct a fish-friendly pump station at the current location of the existing dam.
    - 6b. Construct a fish-friendly pump station about 3.5 miles downstream of the dam and abandon 3.5 miles of earthen ditch.
5. Construct a rock ramp downstream of the dam to raise the water surface below the dam. Lower the existing diversion ditch elevation, construct a new flow measuring device, fish screen, and headworks.
6. No action

Alternative 5 was selected as the preferred alternative because a rock ramp spanning the entire width of the creek would provide unimpeded passage for a wider range of species than a fish ladder. Also, the preliminary cost estimate for this alternative was the lowest for all six alternatives (excluding the No Action alternative).

No Action Alternative (TAC Alternative 6)

Under this alternative, no changes would occur to the stream channel, diversion dam, or other diversion-related infrastructure at the site. No changes would occur to the fish screens, diversion canal or bypass pipes. Adult fish would continue to be delayed or prevented to pass upstream of the diversion at certain flow conditions and flashboard / fish ladder configurations. Downstream juvenile fish migration passage conditions would not be improved. No water system modifications would be implemented because the current diversion structures would continue to meet DCID's water needs.

Proposed Action Alternative (TAC Alternative 5)

DWR prepared a *Preliminary Engineering Technical Repor*t and prepared preliminary engineering designs for the preferred alternative (California Department of Water Resources 2014). NHC was then contracted by USFWS to provide a technical review of the DWR preliminary designs and then complete the designs to the 100% level along with a *Basis of Design Report* (Northwest Hydraulic Consultants 2017).

Design Overview

The roughened rock ramp would begin 50 feet downstream of the front face of the existing dam. The distance allows for some energy dissipation for any flow acceleration caused by the concrete dam sill, as well as keeps the roughened rock ramp far enough downstream to allow the dam to be removed if DCID chose to take such action in the future. The roughened rock ram would extend 215 feet downstream at about a two

percent slope. The ramp would include a 75-foot wide typical section that provides sufficient flow depth to meet the fish passage criteria while still maintaining adequate water surface elevations to send the appropriate flow down the diversion ditch. The diversion ditch would be regraded and concrete lined for a total of 1,250 feet with a 0.15 percent slope downstream of the fish screens. The existing fish screen area would be reconfigured to account for the diversion ditch modifications including updating the head gate and the juvenile bypass pipe, as explained in further detail in the following sections.

Roughened Rock Ramp Design

The proposed roughened rock ramp is designed to mimic the natural geomorphic conditions of Deer Creek. Utilizing a design slope of about two percent over 215 feet correlates well with the riffles in the creek both upstream and downstream of the site. The thalweg (deepest part of the channel) of the proposed rock ramp is 0.8 feet below the dam crest, which provides adequate water surface elevation for the reprofiled diversion ditch without raising the water surface elevation upstream of the existing dam during peak flow events. The proposed ramp section would provide a 75-foot wide channel that includes a low flow section. The low flow section has a total width of 25 feet with a five-foot bottom width. A minimum depth of one foot is maintained through the ramp during fish passage design low flows.

The Hydraulic Engineering Center River Analysis System (HEC-RAS) models prepared by DWR were utilized for the hydraulic analysis of the roughened rock ramp. Cross sections though the roughened rock ramp were modified to represent the updated proposed section in both the main channel model and the 50-year model for analysis. Average velocities through the roughened rock ramp during the fish passage design flows range between approximately 1.1 feet / second and 7.8 feet / second. These velocity calculations are averaged over the entire channel section which simplifies the complex and dynamic nature of flow through the ramp. In actuality, the roughness of the ramp would provide regions of slower and higher velocity. The regions with slower velocities would allow both juvenile and adult fish to adequately navigate up the ramp. Additionally, the average velocities through the ramp are similar to the modeled velocities through both the riffle upstream and downstream of the dam and thus mimic the natural geomorphic conditions of Deer Creek. Emergent boulder clusters would also be spaced throughout the roughened rock ramp. The boulders would extend about 1.5 feet to three feet above the bed and provide regions of slower velocity in wake areas downstream of the boulders.

The proposed roughened rock ramp would begin 50 feet downstream of the existing dam, allowing for the dissipation of flow over the existing dam. The distance also keeps the roughened rock ramp away from the structural footing of the dam to avoid negatively influencing the existing structure. As Deer Creek flows over the existing dam crest, velocities are increased, which has created a scour hole over 2.5 feet deep just downstream of the existing dam apron. Typically, a dam upstream of a roughened rock ramp is not preferred because the accelerated flow could adversely affect the ramp. To prevent the potential for these increased forces to cause the proposed roughened rock ramp to fail, the Federal Highway Administration's (FHWA) Hydraulic Engineering Circular No. 14 (2012) was utilized to determine the length required for an energy dissipating pool downstream of the dam; which equated to approximately 47 feet. Thus, the proposed roughened rock ramp was placed 50 feet downstream of the existing dam to provide the adequate distance for the flow to dissipate before reaching the ramp. Additionally, the existing scour hole and streambanks directly downstream of the dam apron would be filled with engineered streambed material to help protect the upstream edge of the roughened rock ramp from erosion and undermining. The proposed material for the roughened rock ramp components was designed utilizing various methods. The design intent is to produce a stable streambed for the roughened rock ramp while still maintaining a dynamic equilibrium based on the channel configuration and the expected flows at the site. The streambed material gradation is proportioned to mimic natural conditions; providing stability during high flows from the larger particle sizes while also including smaller particle sizes to produce a porosity that minimizes the opportunity for flows in

the creek to go entirely subsurface during late-summer and early-autumn low flow periods. To maintain stability through the roughened rock ramp structure, six weirs would be placed across the channel 35-feet apart, with a seventh weir about 40 feet downstream at existing channel grade.

The calculated streambed material would be achieved during construction by using a mixture of three materials with gradations defined as follows: Streambed Sediment, Streambed Cobbles, and Streambed Boulders. The streambed material would be composed of 30 percent Streambed Sediment, 45 percent Streambed Cobbles (12-inch), and 25 percent Streambed Boulders. The three materials supplied to the site would be mixed to provide a well graded distribution of combined streambed materials and placed to a finished minimum thickness of three feet across the entire width of the channel. Additional Streambed Sediment would be placed, where necessary, to ensure voids are satisfactorily filled to minimize the potential for low flows to disappear subsurface. In addition to the mixed material, boulder clusters comprised of five-foot boulders would be strategically placed throughout the roughened rock ramp to replicate the channel morphology upstream and downstream of the project site. These boulders would help insure global stability and hydraulic diversity though the rock ramp.

Diversion Ditch Design

The existing diversion facility requires flashboards installed atop the concrete dam to divert water in low flow conditions. To remove the need for flashboards, the diversion ditch would be re-profiled to reduce the head required at the dam to divert flow. The final design widens and smooths the diversion entrance ditch from about 50 feet downstream of the point of diversion to the headgates, widens and lowers the ditch for about 800 feet downstream of the fish screens, and replaces the Parshall Flume with another concrete flume lower in elevation. The reprofiling of the diversion ditch also requires adjusting the fish screen design.

The diversion entrance ditch would be widened to have a bottom width of at least ten feet and an elevation of 466.5, gradually sloping down to an elevation of 465.9 at the headgates. The invert of the diversion entrance is at about the elevation of the bed just upstream of the dam, reducing the potential for sedimentation problems if the entrance was lowered below the adjacent Deer Creek channel. The diversion ditch would slope down to the fish screen bay entrance to help pass sediment and reduce maintenance in the ditch. After excavation, the ditch would be lined with a reinforced concrete channel floor and walls. The existing headwall would be replaced with a wall of consistent top elevation, but with a lower invert elevation to account for the lowered screenbay.

The diversion ditch downstream of the fish screen bay would be re-profiled to an average slope of 0.15 percent. The diversion ditch would be concrete lined with a 5-foot wide bottom width and 2:1 horizontal:vertical side slopes. The existing Parshall Flume would be replaced with another concrete flume at the existing location. The updated concrete flume was designed in the U.S. Bureau of Reclamation (USBR) WinFLUME software to meet USBR gage standards for flows between about five and 50 cfs. The flume is a custom design to better fit the existing diversion ditch hydraulics and to help ensure proper flow distribution between the diversion ditch and roughened rock ramp.

The hydraulic model created by DWR (2014) was utilized for the proposed diversion ditch. The DWR model originally ended approximately 100 feet downstream of the fish screen area. The model was extended to include the fish screen bay and upstream diversion ditch. Additionally, the regraded sections through the ditch were modified from the original DWR design to incorporate the 0.07 percent slope, the five-foot wide bottom width and 2:1 horizontal:vertical side slopes. The energy grade line in the diversion ditch was compared to the energy grade line in Deer Creek to ensure sufficient head was available at the entrance of the ditch. Cumulative headloss through the paddlewheel, fish screen, and diversion gates are expected to be about 0.5 feet.

Flows through the diversion ditch entrance include the required 33.13 percent of Deer Creek up to 36 cubic feet per second (cfs), plus the additional flow returned to Deer Creek though the juvenile bypass pipe. The rating curve for these flow values were compared to the rating curve for the remaining flow in Deer Creek. As long as the energy grade line elevation in the diversion ditch is equal to, or lower than the energy grade line elevation in Deer Creek, then the diversion ditch would convey the appropriate amount of flow for DCID. The changes to both Deer Creek with the roughened rock ramp and the diversion ditch provide the ability to divert 33.13% of the flows up to 36 cubic feet per second as authorized by the water right, without the flashboards on the existing Deer Creek dam in place.

Fish Screen Design

The proposed fish screen would be located 1.5 feet lower than the existing screens and would be 55 feet long. The proposed fish screen design would replace the juvenile bypass pipe with a new 24–inch-diameter pipe. The layout of the pipe would be affected by the lengthening of the fish screens, but the pipe would discharge at the existing location. The pipe slope would be reduced from 0.01 ft / ft to 0.005 ft / ft over the 85-foot length. The new screens would have a paddlewheel driven gang brush design.

Lowering the screen bay 1.5 feet is required to ensure adequate screen area for diversion flows. However, lowering the screens increases susceptibility to the screens being backwatered through the juvenile bypass pipe by high streamflows. To offset these impacts, flashboard slots were installed downstream of the paddlewheel, and in the channel adjacent to the paddlewheel. Operators may install flashboards to raise the water levels in the fish screen bay. Increasing water levels in the screen bay ensures adequate head to keep pushing flow through the juvenile bypass pipe and maintaining adequate sweeping flows to prevent sedimentation and excessive exposure times for juvenile fish in the screen bay.

Under existing conditions, the screens begin to be backwatered at flows between 350-400 cfs. In proposed conditions, the screens would begin to be backwatered at instream flows of about 50 cfs. Median streamflows are below 400 cfs from about late-April through the end of the diversion season, whereas median streamflows don't drop below 50 cfs until the late-July. Although more frequently backwatered, the screens should be able to divert five cfs as long as streamflows are less than 200 cfs, divert 20 cfs as long as streamflows are less than 450 cfs, and divert 36 cfs as long as streamflows are less than 700 cfs without requiring flashboards to be installed. When streamflows exceed these values, the water level of the instream flow at the downstream end of the juvenile bypass pipe would be greater than the diversion flow water level and flow would go backward up the juvenile bypass pipe inhibiting bypass and sweeping flows if flashboards are not installed. Installation of flashboards can allow water to be screened up to streamflows in excess of 1,000 cfs.

A concrete flume would be located at the current location of the flume in the diversion ditch. The flume would ensure adequate backwatering of the fish screens to ensure approach velocities are within criteria. The flume would have about a 5-foot-wide throat width and a sill elevation 1.3 feet above the local channel invert. The elevation of the sill would be 466.1 feet.

Anticipated Construction Sequence

Project construction would likely mobilize in late June or early July as streamflows reduce to typical summer flows and the spring-run Chinook salmon *(Oncorhyncus tshawytscha)* migration window comes to a close. Due to the depths of the pools on either side of the dam, some construction access would be required from the north bank of the site. An area on the north bank would be cleared for construction staging and for installation of the dewatering diversions. A staging area would also be cleared on the south bank along with improvements to access roads to improve construction traffic. Excavation and re-profiling of the diversion ditch downstream of the fish screens may also start during this time.

Once the stream has been dewatered, a haul road would be constructed down the bank to the location of the rock ramp. The large boulders and rock required for the roughened rock ramp would be hauled in and placed. Placement would likely involve a large excavator mixing the streambed material and placing the material and boulders, a backhoe with a vibratory compactor in back compacting the streambed in place, and a front-end loader moving material around the site.

A small excavator would be used to widen the diversion ditch near the headgates. The ditch would be slightly over-excavated on shotcrete to grade. This work would likely occur concurrently with the work on the roughened rock ramp. The fish screens would be removed, and much of the existing screen bay would be demolished. The new screen bay would be constructed with cast-in-place concrete. The existing screens would be reinstalled with new screens matching the existing design. Instream construction should be complete by late-September, and equipment demobilized and BMPs installed by late-October.

The project schedule is dependent on acquiring all environmental permits and favorable stream flows in early summer. It is anticipated that construction will begin in 2019 and continue for one construction season (until late-October). If all environmental permits are not acquired, or if early summer stream flows are too high to accommodate the stream diversion system, the project may occur in 2020 and \ or may be implemented in two construction seasons.

Constraints on Construction

The two largest constraints on construction would be the instream work window and presence of juvenile salmonids. The work window is between the end of the spring-run Chinook salmon migration, and the start of the fall-run Chinook salmon migration. At least 66 percent of the streamflow would have to be diverted past the site to downstream diversions while maintaining diversion flows to DCID. The diversion flow would also have to be screened at all times during construction as juvenile salmonids are present at the site throughout most of the year.

Flow Diversions During Construction

As shown on Sheet G1 in the design plans, existing high flow channels on the north floodplain would be improved to act as a temporary diversion channel to route streamflow around the site. The channel would likely be lined to help prevent erosion and infiltration. A temporary diversion structure would be constructed at the top of the riffle above the dam to push most streamflow through the temporary diversion channel. Large diversion pipes with flow control would be installed to maintain flow to the DCID diversion ditch. Flashboards would be installed at the dam to dewater the work area downstream of the dam. Local dewatering would also be required upstream of the dam to get the diversion entrance dry enough for concrete placement. It is expected that the contractor would route DCID diversion flow around the fish screen bay and the diversion ditch excavation area using large pipes. Some excavation may be required to maintain grade for flows diverted around the site in the pipes. Fish screens would be required to screen the diversion flow. This may be done by requiring the contractor to provide temporary fish screens. The temporary fish screens would be located at the upstream end of the diversion pipes.

Hydraulic and Geomorphic Monitoring

The Project would require post-project monitoring. In addition to biological and ecological monitoring, a number of hydraulic and geomorphic conditions at the site should be monitored. Roughened rock ramps are generally a new technology for providing fish passage over grade control and channel spanning structures. As such, design criteria for hydraulic performance is not well developed. Key aspects of the design recommended for monitoring the hydraulic and geomorphic performance include:

- Monitor variability in cross-sectional velocity throughout the ramp. A key assumption of a roughened rock ramp design for fish passage is that the emergent boulders and relative roughness of the bed

provide low velocity corridors to allow passage through the site. The hydraulic conditions near the emergent boulders would vary with relative submergence of the boulders, as well as due to scour and deposition near the boulders. Evaluate changes in velocity near the boulders under various flows and over time, as well as if spacing, variability in height, and geometry are adequate.

- Monitor the continued presence of a low flow channel which meets depth criteria for passage of salmonids. The engineered streambed material may reorganize in large events. The boulder weirs would maintain grade in the roughened rock ramp, and engineered streambed material mobilized off of the ramp in large events would likely be replaced by bed load mobilizing from upstream. However, local scour and deposition of the bed and the engineered streambed material may change the channel profile and local hydraulics over time.
- Monitor the channel banks and overbank areas for additional scour and erosion. The presence of a large, rough, and hardened surface in the channel may cause local scour to occur along the bankline, or potentially push more flow into the overbank. The design is intended to blend well into the bank and not change water levels upstream of the site.

Operation and Maintenance

The responsibilities of operating and maintaining the diversion structure, roughened rock ramp, and fish screens are to be identified in a Memorandum of Agreement (MOA) between DCID and CDFW. This section provides expected operation and maintenance requirements for the hydraulic function of the new roughened rock ramp, diversion entrance and fish screens.

Seasonal Maintenance

- The new fish screen bay would be lower in elevation relative to the existing screen bay. This would require installation of flashboards in the downstream end of the screen bay to ensure adequate bypass flows and screen exposure criteria are met. From November 1 through May 1 of each year, when diversion flows are reduced to 10 cfs or less, and streamflows are increased, flashboards should be installed behind the paddlewheel and in the channel immediately adjacent to the paddlewheel to a height three feet above the floor. If the headgates are open to divert water, the gate to the juvenile bypass pipe should also be kept completely open. This setup would allow up to 30 cfs to be diverted for streamflows up to 1,000 cfs.
- Flashboards should be installed along the top of the fish screen bay walls at all times except when access is needed for maintenance.

Routine Maintenance

- Work should only be performed on the fish screens when fish screen cleaning drive mechanism is disabled. Do not make adjustments or repairs to fish screen while it is operating.
- Inspect drive arms and paddle wheel bearings for loose set screws, excessive wear, and lubrication needs. Bearings should be lubricated as needed (~once per month).
- Inspect chain and sprockets for wear. Lubricate chain as needed (~once per month).
- Inspect gearbox for loose set screws in gears, excessive wear, and lubrication needs. Misalignment of gears may indicate set screws are loose. Lubricate bearings and gears as needed (~ once per month).
- Inspect wiper carriage wheels / bearings for wear and lubrication if possible. Inspect wiper brushes for operation, adjustment and wear. Wipers should evenly touch screen panels with moderate pressure. Replace wipers when brushes become worn to less than ½ inch or are not adjustable.
- Inspect screen panels for fit, gaps, loose rivets, corrosion, etc. There should be no gaps greater than the diameter of the screen perforations.
- Inspect gearbox, wiper system, and framework for loose or missing bolts or cracked welds. Tighten, replace, or weld as needed.

- Inspect screen for accumulated debris or sediment load. Clean sticks and vegetation from screen as needed. Clean sediment from front of screen before it builds high enough to contact wipers and cause damage.
- Monitor water level in front of screens. If water overtops screens, adjust headgate or increase bypass valve opening. Contact CDFW concerning these adjustments.
- Brushes should cycle frequently enough to keep screens clean but slowly enough to avoid excessive wear on moving parts. Approximately three brush passes per minute seems to work well.
- Diversion should be shut down or a replacement screen installed when a screen is removed for repair.
- Sandblasting and painting and major overhaul should occur approximately every 3-5 years depending on conditions. Sandblasting and painting should occur if rust is noticeable on screen components.

Requirements and Mitigations Incorporated into the Proposed Action

The project includes a number of Resource Protection Measures (RPMs) that were developed to protect sensitive resources that could potentially be impacted by the project and are hereby incorporated into the project description and plans. These RPMs and project components are summarized below:

- **AIR-1:** Fugitive Dust Permits will be obtained from the Tehama County Air Pollution Control District (TCAPCD).
- **AIR-2:** All construction equipment will be maintained in proper tune according to manufacturer's specifications.

  To the extent feasible, the use of diesel construction equipment meeting the California Air Resources Board's (CARB) 1996 or newer certification standard for off-road heavy-duty diesel engines will be maximized.

  If required by the TCAPCD, verify that owners or operators of vehicles are registered with the CARB Diesel Off-Road On-Line Reporting System (DOORS) program: (www.arb.ca.gov/msprog/ordiesel/ordiesel.htm). The DOORS program assists fleet owners in reporting their off-road diesel vehicle inventories to reduce vehicle emissions, as required by the In-Use Off-Road Diesel Regulation.

  If required by the TCAPCD, verify that owners or operators of portable engines and certain other types of equipment are registered under the CARB's Statewide Portable Equipment Registration Program (PERP) in order to operate their equipment throughout California without having to obtain individual permits from local air districts: (www.arb.ca.gov/portable/portable.htm).
- **VEGETATION-1:** Disturbance to existing vegetation will be avoided or minimized to the extent possible.
- **VEGETATION-2:** Disturbance to riparian vegetation will be avoided or minimized to the extent possible.
- **VEGETATION-3:** A revegetation plan will be prepared in coordination with the landowners to replace impacted riparian wetlands and other woody vegetation by a measure of quantity and quality equal to, or exceeding impacts of the project using appropriate native plant species.
- **VEGETATION-4:** All heavy equipment shall be thoroughly cleaned prior to mobilization onsite to remove any soil, weed seeds and plant parts in order to reduce the importation and spread of invasive exotic plant species.
- **VEGETATION-5:** Only certified weed-free straw shall be used for erosion control or other purposes to reduce the importation and spread of invasive exotic plant species.
- **VEGETATION-6:** Road improvement and grading activities shall be conducted in such a manner that disturbances are confined to the already disturbed road prism.

- **VEGETATION-7:** Vehicle traffic will be limited to the existing disturbed road prism. The condition of the road post-project will be coordinated with the landowners and all measures will be taken to return the road to pre-project conditions. Truck passing and parking areas will be established in areas away from Tehama navarretia, Bidwell's knotweed and hogwallow starfish populations and seasonal wetlands. Truck passing areas will be clearly mapped in the field with high visibility fencing or flagging and all construction personnel will be made aware of the sensitive resources and avoidance measures.
- **VEGETATION-8:** An appropriately-timed preconstruction rare plant survey will be conducted prior to the construction of the two new road segment realignments to ensure that nothing was missed during the winter 2018 rare plant survey.
- **VEGETATION-9:** Disturbance associated with the two new road segment realignments shall be restricted to the degree possible to the new road prism. To the extent possible, truck passing and parking areas associated with the new road prism will be established in areas away from Tehama navarretia and hogwallow starfish populations.
- **VEGETATION-10:** No smoking will be allowed on the construction site or within the project area, for fire prevention purposes.
- **VEGETATION-11:** No road improvements shall occur within the 0.6-mile reach of the south access road within the sub-watershed of the large vernal pool / Hoover's Spurge population.

  Signage in both directions and flagging shall be used to clearly indicate the sensitive habitat area bordering the eastern side of the road. All drivers and machinery operators will be made aware of the sensitive resource area and will confine all vehicle / machinery travel to the existing road surface.
- **FISH-1:** Instream work can occur between July 1st and September 30th. Instream work could start sooner if the California Department of Fish and Wildlife (CDFW) determines that the adult CV spring-run Chinook salmon are no longer present based on environmental conditions and real time passage data. Instream work could be extended October 14th, if environmental conditions which would preclude juvenile steelhead and spring-run Chinook salmon emigration or adult steelhead and late-fall-run Chinook salmon immigration are expected to persist. Instream work outside of the July 1st to September 30th work window must be approved by CDFW and the National Marine Fisheries Service (NMFS) on a case-by-case basis with details on how take will be avoided and / or minimized.
- **FISH-2:** All construction debris (concrete, metal, etc.) from the fish passage improvement-related construction activities shall be removed from the active stream channel post-construction.
- **FISH-3:** Immediately prior to installation of temporary dam structures, a qualified fish biologist, in coordination with CDFW, will conduct snorkel surveys above and below the dam and diversion, to identify presence of salmonids. The U.S. Fish and Wildlife Service (USFWS), in coordination with the contractor, and in consultation with NMFS and CDFW, will ensure that qualified fish biologists are onsite to implement fish rescue operations within the dewatered area through the use of herding, seining and / or electrofishing, if necessary. Best professional determination will be used to decide which method(s) of rescue is to be used and where the relocation of captured fish, either upstream or downstream of the temporary dams is to occur. Biologists will first try to haze and herd fish out of the fish exclusion area. If fish biologists determine that the use of electrofishing is necessary for the efficient and successful removal of fish, NMFS electrofishing guidelines (National Marine Fisheries Service 2000) will be strictly followed. The fish rescue team will be comprised of fishery biologists with professional experience using seines and electrofishing equipment. The same methodologies will be used during dewatering of the diversion ditch.
- **FISH-4:** For the duration of the project, all diverted water must be screened through the existing

screens, which currently do not meet CDFW and NMFS criteria, however best professional judgement will be used to prevent harm to juvenile fish through frequent monitoring and site specific modifications as needed. Furthermore, all water returned to the stream will comply with NMFS bypass return criteria, including consideration of the location of the bypass pipe exit (i.e. bypassed water will enter the watercourse and will not be of an excessive height, or empty onto rocks, etc.) for the duration of the bypass period.

- **FISH-5:** All Reasonable and Prudent Measures and Terms and Conditions found in the Programmatic Biological Opinion issued by NMFS for the project (National Marine Fisheries Service 2016) will be adhered to.
- **FISH-6:** All dewatering and re-watering activities will be conducted slowly, in order to minimize disturbance to fish. A qualified fisheries biologist will be onsite during these activities, and CDFW will be notified prior to these activities.
- **FISH-7:** All water pumps used during construction shall be screened to meet CDFW and NMFS criteria, unless deemed unnecessary by CDFW and NMFS (i.e. if water was being diverted from an off-channel pool). The refueling of pumps will occur away from the wetted area / channel. If pumps are using fuel, they will be outfitted with a spill kit.
- **FISH-8:** Adequate erosion and pollution control measures shall be taken to ensure that sediment, turbidity, petroleum products or other harmful chemicals do not enter Deer Creek as a result of construction activities. Standard Best Management Practices (BMPs) shall be incorporated into the project designs.
- **FISH-9:** BMPs will be developed and implemented to ensure that wet concrete does not enter Deer Creek, wetlands or other aquatic sites during construction.
- **FISH-10:** All reasonable measures will be taken to minimize impacts to lamprey, including spending more time at the area as it becomes dewatered (and they are moving out of the mud, chasing the water as it recedes), and possibly electroshocking.
- **FISH-11:** Appropriate measures will be used to avoid the spread of aquatic invasive species such as zebra / quagga mussels, New Zealand mudsnails and chytrid fungus to and from the project area according to the current CDFW Aquatic Invasive Species Disinfection / Decontamination Protocols (Northern Region) and the current USFWS Red Bluff Fish and Wildlife Office Anadromous Fish Restoration Program Hazard Analysis Critical Control Point Plan.
- **WILDLIFE-1:** Within ten (10) calendar prior to the onset of potentially disturbing construction activities, areas that will be disturbed within 100 feet of water bodies shall be surveyed by a qualified biologist to determine if any western pond turtles or turtle nests are present. If any turtles or turtle nests are found, a qualified and permitted biologist shall determine and implement appropriate relocation procedures, in coordination with CDFW. The site shall be checked daily by trained construction workers prior to work commencing, including underneath vehicles and equipment that will be used. If turtles are found, they will be moved by a qualified and permitted biologist to an area of safety out of harm's way.
- **WILDLIFE-2:** Within ten (10) calendar days prior to work in aquatic habitats, water bodies shall be surveyed by a qualified biologist to determine if any foothill yellow-legged frogs are present. If any foothill yellow-legged frogs are found, a qualified and permitted biologist shall determine and implement appropriate relocation procedures, in coordination with CDFW. The site shall be checked daily by trained construction workers prior to work commencing, including underneath vehicles and equipment that will be used. If foothill yellow-legged frogs are found, they will be moved by a qualified and permitted biologist to an area of safety out of harm's way.

- **WILDLIFE-3:** Any tree removal, vegetation clearing, or the onset of potentially disturbing construction activities shall 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). Note: Also see measure WILDLIFE-4.

  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 shall be conducted by a qualified biologist no more than seven (7) days prior to the initiation of the onset of these activities or as appropriate survey protocols require. If active raptor nests are found to be present, tree removal, vegetation clearing and the onset of potentially disturbing construction activities shall 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 shall commence within the buffer area until the qualified biologist determines that the young birds have fledged or the nest is no longer active.

  Construction activities shall occur continuously (not including weekends) until the end of the nesting season to discourage raptors from initiating nesting. If construction activities cease for more than seven (7) consecutive days (including weekends), all construction activities shall cease until CDFW can be consulted to determine if a subsequent raptor nesting survey must be performed.

  Active or inactive nests are not to be disturbed or removed as a result of construction activities without DCFW consultation per Fish and Game Code Section 3503.5.

- **WILDLIFE-4:** Any tree removal, vegetation clearing, or the onset of potentially disturbing construction activities shall occur between August 1 and March 1 (outside of the nesting season for grasshopper sparrow, yellow-breasted chat, loggerhead shrike, yellow warbler and other nesting migratory birds). Note: Also see measure WILDLIFE-3.

  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 shall be conducted by a qualified biologist no more than seven (7) days prior to the initiation of the onset of these activities. If active bird nests are found to be present, tree removal, vegetation clearing and the onset of potentially disturbing construction activities shall 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 shall commence within the buffer area until the qualified biologist determines that the young birds have fledged or the nest is no longer active.

  Construction activities shall occur continuously (not including weekends) until the end of the nesting season to discourage avian species from initiating nesting. If construction activities cease for more than seven (7) consecutive days (including weekends), all construction activities shall cease until CDFW can be consulted to determine if a subsequent nesting bird survey must be performed.

  Active nests are not to be disturbed or removed as a result of construction activities per Fish and Game Code Section 3503.

- **WILDLIFE-5:** Prior to the onset of potentially disturbing construction activities, a Swainson's hawk nesting survey of the construction area and adjacent suitable habitat shall be conducted by a qualified biologist in accordance with the protocols in *Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley* (Swainson's Hawk Technical Advisory Committee 2000). If active Swainson's hawk nests are found to be present, the onset of potentially disturbing construction activities shall 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 shall commence within the buffer area until the qualified biologist determines that the nest is no longer active.

- **WILDLIFE-6:** Within seven (7) calendar days prior to the onset of potentially disturbing construction activities, a burrowing owl nesting / roosting survey of the construction area and adjacent suitable habitat shall be conducted by a qualified biologist. If active burrowing owl burrows are found to be present, the onset of potentially disturbing construction activities shall be suspended until a qualified biologist, in consultation with CDFW, can establish an appropriate protective buffer area to minimize impacts to the nesting / roosting birds. No construction activities shall commence within the buffer area until the qualified biologist determines that the burrow is no longer active.
- **WILDLIFE-7:** Prior to any vegetation removal, a survey of the vegetation to be removed shall be conducted by a qualified biologist to ensure that pallid bats are not roosting in the area to be removed.

  If pallid bats are found to be roosting within the vegetation to be removed, these activities shall be suspended until a qualified biologist, in consultation with CDFW, can establish appropriate measures to minimize impacts to this species. Examples of measures would include tree removal over several days, removal at night after bats have emerged, delayed removal until after the maternity season, etc.
- **WILDLIFE-8:** All vegetation clearing within potential western red bat roosting habitat (woody riparian habitat with mature trees) shall occur between August 31 and May 1, in order to minimize the likelihood of injuring or killing juvenile bats during the period when they are still unable to fly.

  As it relates to bats only, tree removal may occur prior to August 31 based upon a site-specific tree removal plan approved by CDFW. The plan shall consider or include the following:

  Monitoring of the affected trees shall be conducted using bat detection equipment within five (5) calendar days of tree removal. If red bats are not present, tree removal can proceed. If red bats are present, a survey on the night prior to tree removal may help confirm the use of that tree by red bats. If red bats are potentially using the tree, a qualified biologist shall monitor removal / trimming of trees that provide suitable red bat roosting habitat. Prior to tree removal / trimming, each tree shall be shaken gently, and several minutes shall pass before felling trees or limbs to allow red bats time to arouse and leave the tree. The biologist shall search downed vegetation for dead or injured red bats and report any dead or injured special-status bat species to CDFW. All bat observations should be reported to CDFW.
- **WILDLIFE-9:** Prior to construction, a qualified biologist will inspect the project site for signs of denning by ringtails.

  If ringtails are found to be denning, construction activities will be suspended until a qualified biologist, in consultation with CDFW, can establish appropriate measures to protect ringtail.
- **WILDLIFE-10:** The USFWS shall 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. All protective measures imposed by USFWS through the consultation shall be adhered to.
- **WILDLIFE-11:** To reduce potential impacts to the valley elderberry longhorn beetle (VELB) to less than significant levels, the proposed project shall comply with the current USFWS *Framework for Assessing Impacts to the Valley Elderberry Longhorn Beetle (Desmocerus californicus dimorphus)* (U.S. Fish and Wildlife Service 2017).
- **WILDLIFE-12:** Prior to construction, all elderberry shrubs to be avoided within 150 feet of any project activity will be clearly flagged, marked and maintained throughout construction in order to avoid impacts to the valley elderberry longhorn beetle. All elderberry shrubs to be avoided within 100 feet of project activity will be marked with high-visibility orange fencing.
- **WILDLIFE-13:** Project activities shall avoid direct impacts to seasonal wetlands or other potential large branchiopod (fairy shrimp, tadpole shrimp) habitats, to the extent possible.

High-visibility fencing shall be installed in areas where equipment will be working near any potential large branchiopod habitat that is not to be disturbed.

No road grading or road improvements shall be allowed in or, where feasible, near potential large branchiopod habitat that is not to be disturbed.

All transporters of potentially hazardous materials (fuel, oil, cement, etc.) will be notified as to the presence of potential large branchiopod habitats, and be required to inspect their vehicles prior to entry and exit of the project site 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 potential large branchiopod habitat.

- **WILDLIFE-14:** For potential large branchiopod habitat that cannot be avoided within the existing roads, a layer of geotextile material will be placed across the entire pool bottom up to the edge of the depression. 0.5- to 2-inch diameter gravel or rock will be used to fill the basin up to a level surface with the surrounding road elevation. Gravel / rock fill will be placed prior to the onset of construction and will be maintained throughout the project. After construction is completed, the gravel / rock and geotextile material shall be removed and the pool will be left in pre-project conditions.
- **WILDLIFE-15:** A qualified biologist (biological monitor) shall regularly inspect construction-related activities to ensure that no unnecessary disturbance to special-status species and / or their associated habitats occurs. The biological monitor shall 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 CDFW, USFWS and / or NMFS immediately.
- **WILDLIFE-16:** Prior to the onset of construction activities, a construction worker education program shall be implemented that includes an explanation of all special-status animal species, identification, avoidance measures, and federal and state laws that protect the species. This shall include, at a minimum, those species listed in the environmental documents.
- **WILDLIFE-17:** All food-related trash will be disposed of in closed containers and removed from the project area daily during the construction period. Construction personnel will not feed or otherwise attract wildlife to the project area.
- **WILDLIFE-18:** No pets will be allowed within the project area.
- **WETLAND-1:** Project activities will avoid impacts to wetlands and other aquatic habitats to the extent possible.
- **WETLAND-2:** High-visibility fencing will be installed in areas where equipment will be working near any wetlands or other aquatic habitats that are not to be disturbed.
- **WETLAND-3:** Construction crews will be informed about the importance of avoiding sensitive areas, including wetlands.
- **WETLAND-4:** A Clean Water Act Section 404 Permit will be obtained from the U.S. Army Corps of Engineers and a Clean Water Act Section 401 Certification will be obtained from the Central Valley Regional Water Quality Control Board (RWQCB).
- **WETLAND-5:** A California Fish and Game Code Section 1600 Lake or Streambed Alteration Agreement will be obtained from CDFW.

- **CULTURAL-1:** The 400-foot section of access road passing within 100 feet of DCID Site #3 shall be considered environmentally sensitive and any use or modification of the access road in this area (e.g., placement of fill materials) shall be confined to the approximate footprint of the existing roadbed.
- **CULTURAL-2:** Prior to the onset of construction, two new permanent DCID south access by-pass routes shall be constructed and used for all project activities to completely avoid impacts to DCID Site # 1 and DCID Site #2.
- **CULTURAL-3:** At DCID North #1, where avoidance is not feasible, composite environmental matting shall be in place for the duration of Project construction in accordance with the methods outlined in White and Reifschneider-Smith (2018). The composite matting shall be composed of a basal layer of landscaping fabric, capped by a minimum 4 inch thick bed of wood chips, in turn capped by environmental matting. The composite matting shall cover any portion of impacted archaeological deposits and a 10-foot buffer on all sides. The integrity of the matting shall be checked on a daily basis and maintained as necessary to protect the site for the duration of Project construction.

  Equipment and vehicle traffic shall be confined to the matting in the vicinity of DCID North #1.

  Prior to installation of the basal fabric, boulders scraped onto the site surface during the original DCID North Access construction shall be hand removed and the tree, used as a fence corner-post at the south edge of the locus shall be flush cut.
- **CULTURAL-4:** In the event subsurface archaeological resources are encountered during ground-disturbing activities, all work will cease at the general area of discovery and the USFWS regional archaeologist, or other lead agency archaeologist, will be notified immediately. A field exam by a professional archaeologist may be required and further steps for resource protection will be implemented, including mitigation and consultation with the Native American Indian community if human remains are encountered (following Native American Graves Protection and Repatriation Act procedures). Work may proceed on other parts of the project site while mitigation for historical, unique archaeological or tribal resources is being carried out.
- **HAZ-1:** A designated concrete washout area will be located at least 100 feet from any high water mark within adjacent waterways, and from any wetlands and will be developed and used following the U.S. EPA Stormwater BMP for a Concrete Washout.
- **HAZ-2:** BMPs will be developed and implemented to ensure that wet concrete does not enter Deer Creek or other aquatic sites during construction.
- **HAZ-3:** Measures WATER-3 through WATER-6 associated with potential petroleum product spills will be fully implemented.
- **HAZ-4:** Construction equipment and materials shall not be stored or stockpiled in the creek channel, and shall be stored at least 50 feet from the top of the stream bank, any wetlands or other aquatic sites.
- **WATER-1:** All construction shall be conducted in the summer / early fall during the low flow period. Any work within the channel and banks, outside of this instream work window must be isolated from flowing water and dewatering will be required.
- **WATER-2:** Monitoring of water turbidity and settleable materials shall be conducted in accordance with the Clean Water Act Section 401 Certification through consultation with the RWQCB.
- **WATER-3:** All equipment and machinery that contains fuel, oil or other petroleum products used during construction-related activities shall be checked for petroleum leaks immediately prior to being mobilized to the project site, and again each day prior to use.
- **WATER-4:** All equipment refueling and / or maintenance shall take place within a secondary

containment structure and a minimum of 100 feet away from Deer Creek, any wetlands or other aquatic sites.

- **WATER-5:** An emergency spill kit and absorbent oil booms will be onsite during construction activities.
- **WATER-6:** All equipment operations within the channel and banks of Deer Creek will be required to use readily biodegradable hydraulic oil.
- **WATER-7:** A dewatering permit will be obtained from the RWQCB, if deemed necessary based on the dewatering methods used.
- **SOIL / GEO / MIN-1:** After ground-disturbing activities are complete, all disturbed areas (outside of the active stream channel) shall be seeded with native plant species and / or mulched as described in the revegetation plan and the Stormwater Pollution Prevention Plan (SWPPP), if required.
- **SOIL / GEO / MIN -2:** Construction of all project actions shall comply with RWQCB Basin Plan Objectives. Standard BMPs will be incorporated into the project designs and / or the SWPPP, if required.
- **SOIL / GEO / MIN -3:** If the total disturbance area is greater than one acre, a Notice of Intent will be submitted to the State Water Resources Control Board to obtain coverage under the National Pollution Discharge Elimination System General Permit for Discharges of Stormwater Associated with Construction Activity.

Alternatives Considered but Dismissed

The following additional alternatives that were developed in the *Preliminary Engineering Technical Report* (California Department of Water Resources 2014) were considered by the TAC but were dismissed due to the following reasons.

Construct a Side Channel Around the Existing Dam Structure.

This alternative was eliminated for several reasons. The location of the side channel was within a depositional area, situated along the right bank of the channel on the inside of a very sharp bend where velocities slow down and sediment deposits. Therefore, the side channel would have a high risk of failure with high maintenance needs. Also, there was also an equal concern with the side channel exit location and whether or not fish would find their way into the side channel versus attempting to pass over the dam due to the attraction flow sheeting over the dam.

Construct a Step Pool Channel Below the Dam.

This alternative was eliminated due to the existing topography and the geologic conditions within the project area. The step pool design requires keying the rock features into the channel banks. The channel banks are very low and made of sand and gravel which are not suitable for stabilizing rock weirs. TAC members were concerned with the possibility of the channel flanking the structure which could create a new barrier for fish.

Construct a Fish Ladder at the Dam.

This alternative was eliminated due to the lifespan of a fish ladder, the operation and maintenance, and fish use was considerably lower when compared to a natural channel.

Remove the Dam and Existing Fish Screen and Construct a Fish-friendly Pump Station.

This alternative was eliminated due to the high cost to construct and operate the facilities. Large pumps were needed to divert 36 to 60 cfs. The power and maintenance cost for a pumping station would be very high.

3.0 Affected Environment and Environmental Consequences

This section contains background information and descriptions of the natural and cultural resources found in the project area that could be affected by the proposed project and the No Action alternative. This is followed by a description of the methods used to determine the environmental impacts to the affected environment for each resource type. An analysis is then provided of the environmental impacts that can be expected to the affected environment for each resource type under the two alternatives discussed in this document. The analyses of anticipated environmental impacts include those required by both CEQA and NEPA. Mitigation measures that would reduce significant impacts to less than significant levels are listed, if applicable. California law requires lead agencies under CEQA to adopt a Mitigation Monitoring and Reporting Program (MMRP). Environmental commitments in conjunction with any mitigation measures needed as conditions of project approval would be included in a MMRP to verify compliance.

3.1 Aesthetics

3.1.1 Affected Environment

Deer Creek, an eastside Sacramento River tributary, is located in Tehama County. Deer Creek extends from its peak at Butt Mountain and travels approximately 60 miles to its confluence with the Sacramento River near Vina, California. Deer Creek between the boundary of the lshi Wilderness and the DCID diversion and is classified as wild (Bureau of Land Management 1993) because the water quality is good, there are no impoundments and there are no access roads or shoreline developments. Scenic quality was determined to be an outstandingly remarkable value and is eligible for inclusion in the National Wild and Scenic Rivers System. While eligible for inclusion, no Bureau of Land Management Plan is in place as the project site is located on private land. The scenic quality of Deer Creek is evaluated as an "A" and would be managed under a Visual Resource Management Class I prescription. The BLM objective of class 1 is to preserve the existing character of the landscape. A powerline crosses the creek at one point, however, it does not noticeably affect the river environment.

3.1.2 Environmental Consequences / Impacts and Mitigation Measures

Methodology

An aesthetic resource impact analysis in the project area was based on document review, site analysis and the CEQA significance criteria. Significance thresholds are used to evaluate the proposed project's potential impact on the visual character of the project area.

The project would have a significant impact if it would:

a) Have a substantial adverse effect on a scenic vista;
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway;
c) Substantially degrade the existing visual character or quality of the site and its surroundings; or
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area.

No Action Alternative

Under this alternative, no impacts to the visual character of the project area would occur. No changes would occur to the character of the aesthetic features and existing land uses. The existing upstream visual characteristics related to the presence of the existing dam would remain.

Proposed Action Alternative

Under this alternative, any direct impacts to aesthetics would be considered short-term and minor in intensity. The project is located on private land and not included in a National Wild and Scenic Rivers System management plan. The relatively isolated nature, coupled with the topography and vegetation of the project area helps shield temporary visual construction impacts from view. The proposed project construction would have a short-term impact on the visual environment. The project is not located within a state scenic highway. Some slightly noticeable changes to the site would occur, however the general aesthetic nature of the site would not be altered. No new light sources would result from the proposed project. The impacts of project implementation on aesthetic resources would therefore be less than significant.

3.2 Agricultural Resources

3.2.1 Affected Environment

The project site is located in a valley and foothill setting in Tehama County. Agricultural uses in the general area include livestock grazing and irrigated cropland. Water from the existing diversion is used by DCID to provide its customers with irrigation water to over 1,800 acres of farm and ranch land.

The county is characterized as agricultural, where agriculture has historically been and will continue to be a major economic base. In addition, the agricultural community is responsible for much of the area's rural character. The preservation of agricultural resources is identified as an objective in the County's general plan.

Much of the unincorporated land in Tehama County is agricultural land used for livestock production. Tehama County participates in the Williamson Act and has established agricultural preserves to encourage long-term agricultural production. There four parcels that border, or are within the project area, are all privately owned. All parcels are enrolled in the Williamson Act in Non-Prime Agricultural Land. The Tehama County General Plan designation for the parcels is Upland Agriculture District (U-A). The Tehama County zoning designations within the project sites are zoned Agricultural / Upland District (AG-1). A search of the Farmlands Mapping and Monitoring Program of the California Department of Conservation (California Department of Conservation 2019) found no Prime Farmland, Unique Farmland, or Farmland of Statewide Importance within or near the project site.

Ten different soil map units occur within the project area according to the local soil survey (Soil Conservation Service et al. 1967). The soils mapped within the project sites include the following map units (Table 2).

Table 2. Land Capability Classifications		
Soil	**Land Capability Classification**	**Capability Classification Description**
Molinos fine sandy loam (My)	I-1	Soils have few limitations that restrict their use. Soil has an erosion hazard, actual or potential.
Keefers loam, 0 to 3 percent slopes (Kf)	IIIs-3	Soils have severe limitations that reduce the choice of plants or require special conservation practices, or both. Soil is limited mainly because it is shallow, droughty, or stony. Soil has a problem or limitation of slow permeability of the subsoil.
Millrace gravelly fine sandy loam, 0 to 3 percent slopes (Mp)	IVs-4	Soils have very severe limitations that restrict the choice of plants, require very careful management, or both. Soil is limited mainly because it is shallow, droughty, or stony. Soil has a problem or limitation caused by coarse soil texture or excessive gravel.
Anita cobbly clay (An)	IVw-5	Soils have very severe limitations that restrict the choice of plants, require very careful management, or both. Water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage). Soil has a problem or limitation caused by fine soil texture.
Molinos complex, channeled (Mzt)	VIw-1	Soils have severe limitations that make them generally unsuited to cultivation and limit their use largely to pasture or range, woodland, or wildlife. Water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage). Soil has an erosion hazard, actual or potential.
Toomes extremely rocky loam, 1 to 50 percent slopes (ThE)	VIIs-7	Soils have very severe limitations that make them unsuited to cultivation and that restrict their use largely to grazing, woodland, or wildlife. Soil is limited mainly because it is shallow, droughty, or stony. Soil has a problem or limitation caused by stones or rock outcrops.
Toomes very rocky loam, 30 to 50 percent slopes (TgE)	VIIs-7	Soils have very severe limitations that make them unsuited to cultivation and that restrict their use largely to grazing, woodland, or wildlife. Soil is limited mainly because it is shallow, droughty, or stony. Soil has a problem or limitation caused by stones or rock outcrops.
Tuscan cobbly loam, 1 to 5 percent slopes (TuB)	VIIs-8	Soils have very severe limitations that make them unsuited to cultivation and that restrict their use largely to grazing, woodland, or wildlife. Soil is limited mainly because it is shallow, droughty, or stony. Soil has a problem or limitation caused by shallow depth of soil over bedrock.
Tuscan very stony loam, 3 to 15 percent slopes (TxC)	VIIs-8	Soils have very severe limitations that make them unsuited to cultivation and that restrict their use largely to grazing, woodland, or wildlife. Soil is limited mainly because it is shallow, droughty, or stony. Soil has a problem or limitation caused by shallow depth of soil over bedrock.
Riverwash (Rr)	VIIIw-4	Soils and landforms have limitations that preclude their use to recreation, wildlife, or water supply, or to esthetic purposes. Water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage). Soil has a problem or limitation caused by coarse soil texture or excessive gravel

3.2.2 Environmental Consequences / Impacts and Mitigation Measures

Methodology

The methodology used for an agricultural related analysis involved an assessment of the agricultural resources, production capabilities and current agricultural uses of the project site and surrounding area. The analysis was conducted through document review and site visits.

Impacts to Agriculture Resources would be significant if they would:

a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use;
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract;
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g));
d) Result in the loss of forest land or conversion of forest land to non-forest use; or
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use.

No Action Alternative

Under this alternative, no change from the existing agricultural uses would occur. Diverted flows from Deer Creek would continue to service the DCID customers and no changes would occur to the diversion system. There would be no conflict impacts to the agricultural land uses in the project area.

Proposed Action Alternative

Under this alternative, the amount and timing of water that is diverted would not be reduced. The proposed project would have no impact on any surrounding land agricultural land uses nor would it convert any Prime Farmland, Unique Farmland, or Farmland of Statewide Importance. The proposed alternative would not conflict with any existing zoning for agricultural use, or a Williamson Act contract or involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use. Because there would be no impacts to agricultural resources, no mitigation is required.

3.3 Air Quality

3.3.1 Affected Environment

The project area climate is characterized by hot, dry summers and cool, wet winters. During the summer months from mid-April to mid-October, significant precipitation is unlikely and temperatures range from daily maximums exceeding 100° Fahrenheit (°F) to evening lows in the high 50s and low 60s. During the winter, highs are typically in the 60s with lows in the 30s. Wind direction is primarily along the valley due to the channeling effect of the mountains to either side of the Sacramento Valley. During the summer months, surface air movement is from the south, particularly during the afternoon hours. During the winter months, wind direction is more variable.

The 1977 federal Clean Air Act requires the U.S. Environmental Protection Agency (EPA) to identify National Ambient Air Quality Standards to protect public health and welfare. Similar to federal requirements, the 1988 California Clean Air Act outlines a program to attain the California Ambient Air Quality Standards. Tehama County is part of the Northern Sacramento Valley Air Basin (NSVAB), and is under the jurisdiction of the Tehama County Air Pollution Control District (TCAPCD). The California Air Resources Board (CARB),

California's state air quality management agency, regulates mobile source emissions and oversees the activities of the TCAPCD.

Within Tehama County, the TCAPCD is responsible for adopting and enforcing controls on stationary sources of air pollutants through its permit and inspection programs. Other TCAPCD responsibilities include monitoring air quality, regulating agricultural burning, preparation of clean air plans and responding to air quality complaints from citizens. Based on 2018 CARB data, Tehama County is currently in attainment or unclassified status for all national criteria pollutant standards. 2017 CARB data shows that Tehama County is a nonattainment area for state standards for ozone and particulate matter less than 10 microns in diameter (PM_{10}).

Proximity to sensitive receptors is a concern in air quality analyses. A sensitive receptor is a location where human populations, particularly children, seniors, and sick individuals, are present and where there is a reasonable expectation of continuous human exposure to pollutants. The project is not located near a school, hospital, senior housing or residences. The nearest residence is approximately one mile from the DCID diversion.

3.3.2 Environmental Consequences / Impacts and Mitigation Measures

Methodology

Data for the impacts analysis were taken from 2017 and 2018 CARB data maps as well as discussions with the TCAPCD. The air quality analysis is qualitative, and was conducted by assessing anticipated construction-related impacts of the project and comparing them to existing and anticipated future air quality conditions.

The project would have a significant impact if it would:

a) Conflict with or obstruct implementation of the applicable air quality plan;
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation;
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors);
d) Expose sensitive receptors to substantial pollutant concentrations; or
e) Create objectionable odors affecting a substantial number of people.

No Action Alternative

Under this alternative, no DCID-related construction activities would occur. Because this alternative would not cause any direct short-term emissions, emissions would remain consistent with, and in conformity with applicable plans. Because no activities would occur, this alternative would not adversely affect any sensitive receptors and no long-term indirect impacts to air quality would occur.

Proposed Action Alternative

Under this alternative, construction would occur over a one- or possibly two-season construction schedule. Types of construction equipment to be used would include dozers, front-end loaders, excavators, concrete mixer trucks, rollers or graders, dump trucks and 4-inch water pumps.

Construction-related activities would generate criteria air pollutants, including carbon monoxide, sulfur dioxide, PM_{10}, precursors such as reactive organic gases and oxides of nitrogen, greenhouse gas (GHG) from exhaust and fugitive dust emissions. Sources of exhaust emissions include delivery trucks, commuting worker's motor vehicles and off-road heavy-duty equipment. Sources of fugitive dust emissions, such as particulate matter dust include construction-related activities such as soil disturbance, grading and material hauling. This is considered a potentially significant impact.

The project would involve the use of equipment and travel on unpaved roads to access the sites, which would temporarily contribute fugitive dust in the project area. This source of fugitive dust is associated with PM_{10}, a criteria pollutant, for which the Tehama air basin is in non-attainment. Construction activities associated with the project are expected to take approximately 50 total operation days. Once activities cease at the project area, the resulting impact on air quality and increase in GHG emissions would also cease. This is considered a potentially significant impact.

Construction associated with the proposed project would require the use of equipment that would temporarily contribute to air pollution in the local area but not affect an existing, or projected air quality violation. Exhaust emissions from heavy equipment during construction could contribute to air emissions. Construction activities would generate emissions from diesel- and gasoline-powered equipment and vehicles. Diesel particulate is an identified Hazardous Air Pollutant and Toxic Air Contaminant, emissions of which should be minimized. In addition, vehicles traveling to the site and construction activities would generate GHG emissions from diesel- and gasoline-powered vehicles and equipment. This is considered a potentially significant impact. GHG emissions are further analyzed in Section 3.7 Greenhouse Gas Emissions.

The project is not anticipated to produce toxic air contaminants which could affect surrounding land uses. Also the project will not produce odors that will create a nuisance for any substantial number of people in the immediate area. There are no sensitive receptors located near the project site.

The following measures would be implemented to avoid and minimize impacts to air quality and to mitigate potentially significant impacts listed above to less than significant levels:

AIR-1: Fugitive Dust Permits will be obtained from the Tehama County Air Pollution Control District (TCAPCD).

AIR-2: All construction equipment will be maintained in proper tune according to manufacturer's specifications.

To the extent feasible, the use of diesel construction equipment meeting the California Air Resources Board's (CARB) 1996 or newer certification standard for off-road heavy-duty diesel engines will be maximized.

If required by the TCAPCD, verify that owners or operators of vehicles are registered with the CARB Diesel Off-Road On-Line Reporting System (DOORS) program: (www.arb.ca.gov/msprog/ordiesel/ordiesel.htm). The DOORS program assists fleet owners in reporting their off-road diesel vehicle inventories to reduce vehicle emissions, as required by the In-Use Off-Road Diesel Regulation.

If required by the TCAPCD, verify that owners or operators of portable engines and certain other types of equipment are registered under the CARB's Statewide Portable Equipment Registration Program (PERP) in order to operate their equipment throughout California without having to obtain individual permits from local air districts: (www.arb.ca.gov/portable/portable.htm).

3.4 Biological Resources

3.4.1 Vegetation and Plant Communities

3.4.2 Affected Environment

Vegetation in the study area was characterized by species composition and habitat association. Major plant communities include Annual Grassland / Herbland, Blue Oak Woodland / Savannah and Mixed Riparian Woodland / Scrub. General characteristics and species composition for each are as follows:

Annual Grassland / Herbland

This plant community dominates upland sites on the terraces and slopes on both sides of the riparian corridor of Deer Creek. It comprises the understory of Blue Oak Woodland / Savannah and is present along drier edges and openings in Mixed Riparian Woodland / Scrub. Species composition varies depending on site. On better-developed, deeper soils this community corresponds to the *Bromus* (*diandrus, hordeaceus*)-*Brachypodium distachyon*, *Festuca perennis*, or *Avena* (*barbata, fatua*) semi-natural stand (Sawyer et al. 2009). Thinner rockier soils support the *Lasthenia californica-plantago erecta – Festuca microstachys* alliance (Sawyer et al. 2009). Non-native annual grasses observed include silver European hairgrass (*Aira caryophyllea*), slender wild-oat (*Avena barbata*), false brome (*Brachypodium distachyon*), small rattlesnake grass (*Briza minor*), soft chess (*Bromus hordeaceus*), foxtail chess (*Bromus madritensis*), poverty brome (*Bromus sterilis*), ripgut brome (*Bromus diandrus*), hedgehog dogtail (*Cynosurus echinatus*), annual rye (*Festuca perennis*), rattail fescue (*Festuca myuros*), medusahead (*Elymus caput-medusa*), nitgrass (*Gastridium phleoides*), wall barley (*Hordeum murinum*), Mediterranean barley (*H. marinum* ssp. *gussoneanum*) and bristly Koeler's-grass (*Koeleria gerardii*). Native grasses include small fescue (*Festuca microstachys*) and three-awn (*Aristida oligantha*). Native annual forbs include California plantain (*Plantago erecta*), blow-wives (*Achyrachaena mollis*), fiddleneck (*Amsinkia menziesii*), valley tassels (*Castilleja attenuata*), Fitch's spikeweed (*Centromadia fitchii*), purple clarkia (*Clarkia purpurea*), Fremont's tidy-tips (*Layia fremontii*), California goldfields (*Lasthenia californica*), shiny peppergrass (*Lepidium nitidum*), dwarf lessingia (*Lessingia nana*), bird's-eye gilia (*Gilia tricolor*), q-tips (*Micropus californicus*), marigold navarretia (*Navarretia tagetina*), downy navarretia (*N. pubescens*), hoary popcorn-flower (*Plagiobothrys canescens*), common popcorn-flower (*Plagiobothrys nothofulvus*), dwarf-stonecrop (*Sedella pumila*), foothill clover (*Trifolium ciliolatum*), johnnytuck (*Triphysaria eriantha*) and others. Native geophytes include yellow Mariposa lily (*Calochortus luteus*), narrow-leaved soaproot (*Chlorogalum angustifolium*), wavy-leaved soaproot (*Chlorogalum pomeridianum*), blue dicks (*Dichelostemma capitatum*), round-toothed Ookow (*Dichelostemma multiflorum*), and Bridge's triteleia (*Triteleia bridgesii*). Non-native forbs observed include yellow star-thistle (*Centaurea solstitialis*), filaree (*Erodium cicutarium, E. moschatum*), smooth cat's-ear (*Hypochaeris glabra*), bur clover (*Medicago polymorpha*), grasspink (*Petrorhagia dubia*), hop clover (*Trifolium dubium*), rose clover (*Trifolium hirtum*), sessileheaded clover (*Trifolium glomeratum*), dove's-foot geranium (*Geranium mollis*), smartweed (*Polygonum aviculare*), ruby sandspurrey (*Spergularia rubra*) and others.

Blue Oak Woodland / Savannah

This woodland type occurs at scattered locations along both the northern and southern access roads. A few small areas were mapped within the study area, in association with the lower slopes above the floodplain of Deer Creek, in the vicinity of the construction / staging areas. Blue Oak Woodland / Savanna intergrades with Valley and Foothill Annual Grassland / Herbland, which comprises the herbaceous layer. Depending on the site, vegetation corresponds to the *Quercus douglasii* alliance (Sawyer et al. 2009). Other tree species observed in the mapped woodland in the study area include scattered valley oak (along floodplain), interior live oak (*Quercus wislizenii*) and California juniper (*Juniperus californica*). Shrubs are mostly lacking.

Mixed Riparian Woodland / Scrub

This woodland type is associated with floodplain and banks of Deer Creek and some reaches of the DCID Irrigation Ditch. Composition varies by location. Depending on site, vegetation corresponds either to the *Platanus racemosa* or the *Quercus lobata* alliances (Sawyer et al. 2009). Where the canopy is open and larger trees are lacking, vegetation corresponds to the *Salix lasiolepis* and *Salix exigua* alliances (Sawyer et al. 2009). In addition to California sycamore and valley oak, other tree species observed include white alder (*Alnus rhombifolia*), Oregon ash (*Fraxinus latifolia*), Fremont cottonwood (*Populus fremontii*), Gooding's black willow (*Salix gooddingii*) and edible fig (*Ficus carica*). Shrubs and subshrubs include sandbar willow (*Salix exigua*), arroyo willow (*Salix lasiolepis*), blue elderberry (*Sambucus nigra* ssp. *caerulea*), California rose (*Rosa californica*), hoary coffeeberry (*Frangula californica ssp. tomentella*), western spicebush (*Calycanthus*

occidentalis), buttonwillow (*Cephalanthus occidentalis*), Himalayan blackberry (*Rubus armeniacus*), California blackberry (*Rubus ursinus*) and poison oak (*Toxicodendron diversilobum*). Vines include California grape (*Vitis californica*), California greenbrier (*Smilax californica*) and California pipevine (*Aristolochia californica*).

In drier sites, the herbaceous component of the understory is comprised of Annual Grassland / Herbland species (see description above). Additional non-native forb species encountered in the understory include bur-chervil (*Anthriscus cauculis*), hedge parsley (*Torilis arvensis*), cleavers (*Galium aperine*), chickweed (*Stellaria media / pallida*), subterranean clover (*Trifolium subterraneum*), sherardia (*Sherardia arvensis*), garden vetch (*Vicia sativa*), hedge-mustard (*Sisymbrium officinale*), horehound (*Marrubium vulgare*) and others. Native forb species include small-flowered miner's lettuce (*Claytonia parviflora*), and a few others. Plants associated with moister sites include natives such as hoary stream-nettle (*Urtica dioica* ssp. *holosericea*), mugwort (*Artemisia douglasiana*), toadrush (*Juncus bufonius*), cocklebur (*Xanthium strumarium*), Canadian horseweed (*Erigeron canadensis*), western goldenrod (*Euthamia occidentalis*), white sweet-clover (*Melilotus albus*), Spanish lotus (*Acmispon americanus var. americanus*), northern willowherb (*Epilobium ciliatum*), bird's-foot trefoil (*Lotus corniculatus*), sticktight (*Bidens frondosa*), common monkey-flower (*Erythranthe gutattus*) and others. Grasses in these moister sites include rice cutgrass (*Leersia oryzoides*), dallisgrass (*Paspalum dilatatum*), Johnsongrass (*Sorghum halapense*) and beardgrass (*Polypogon sp.*). Grasslike plants include scattered Pacific rush (*Juncus effusus*), torrent sedge (*Carax nudata*) and umbrella sedge (*Cyperus eragrostis*).

Emergent Wetland

Small areas of Emergent Wetland are associated with the immediate bank and beds of Deer Creek and along the irrigation ditch. Depending on the site, this vegetation best corresponds to the *Carex nudata* alliance (Sawyer et al. 2009). In addition to torrent sedge, and some species mentioned under Mixed Riparian Woodland / Scrub, others include yellow waterweed (*Ludwigia peploides* ssp. *peploides*), pondweed (pre-flowering *Potamogeton sp.*), and smartweed (pre-flowering *Polygonum sp.*). A small area of emergent wetland / meadow is associated with a topographic swale draining off the main irrigation ditch, at the edge of the southern access road. This wetland supports common spikerush (*Eleocharis macrostachya*), annual rye, mannagrass (*Glyceria declinata*), dallisgrass, common monkeyflower, hawk's-bit (*Leontodon saxitilis*), white-tipped clover (*Trifolium variegatum*) and others.

Seasonal Wetland

Seasonal wetland vegetation is associated with a few, small, isolated depressions that occur along the margins of the southern access road; these were not mapped separately for this botanical investigation (see Jurisdictional Wetlands Delineation, [Tehama Environmental Solutions 2019a]). Vegetation is dominated by marginally hydrophytic non-native grasses, including Mediterranean barley and annual rye. Sub-dominant species in a few depressions include some of those associated with vernal pools in the vicinity, including annual hairgrass (*Deschampsia danthonioides*), coyote thistle (*Eryngium castrense*), stalked popcorn-flower (*Plagiobothrys stipitatus*), Fremont's goldfields (*Lasthenia fremontii*), yellow carpet (*Blennosperma nana*), Sacramento Valley pogogyne (*Pogogyne zyziphoroides*), purselane speedwell (*Veronica peregrina* ssp. *xalapensis*) and hyssop loosestrife (*Lythrum hyssopifolium*). These species are infrequent and not predominant in any of the wetlands in the study area.

3.4.3 Environmental Consequences / Impacts and Mitigation Measures

Methodology

The assessment of potential impacts of the proposed project on vegetation and plant communities is based on a review of databases and pertinent literature, consultation with resource agency staff, and field studies that are documented in a *Revised Survey for Special-status Vascular Plant Species* (Dittes and Guardino Consulting 2019) that was prepared for the proposed project. This document is available on the Red Bluff Fish and Wildlife Office website on the AFRP webpage (http://www.fws.gov/redbluff/afrp.html).

A preliminary investigation was performed that included a query of The California Native Plant Society's Inventory of Rare and Endangered Plants (California Native Plant Society 2018) for Tehama County. The California Natural Diversity Database (CNDDB) (California Department of Fish and Wildlife 2018) was also queried for special-status plant species from the Acorn Hollow and Richardson Springs, and surrounding ten USGS 7.5-minute quadrangles (Dewitt Peak, Panther Springs, Deer Creek Flat, Campbell Mound, Richardson Springs, Nord, Foster Island, Vina, Los Molinos and Tuscan Springs). In addition, the Consortium of California Herbaria was queried for special-status species recorded from the vicinity but not included in the CNDDB (http://ucjeps.berkeley.edu/consortium/). The results of these database queries were used, along with consideration of site location and habitat (including parent material / soils), to compile a list of vascular plant species with potential to occur in the study area (Appendix B).

The field survey was conducted by John Dittes on April 25 and May 4, 2018 (Dittes and Guardino Consulting 2019). A subsequent survey was made of two short road realignment segments on December 19, 2018. The survey was performed with the aid of a map with project study area boundary on an aerial photo-base. An intuitive-controlled survey was performed within the study area. All areas subject to potential disturbance were assessed, along with a minimal 30-foot buffer. This included the project construction footprint, staging area, the approximate 1.8-mile south access road on the southeast side of Deer Creek and the approximate 0.6-mile north access road on the northwest side of Deer Creek.

All plant species encountered were identified to the taxonomic level necessary to determine legal status and scientific significance. Plants not readily identified in the field were identified later in the lab. Scientific names follow Baldwin et al. (2012); common names follow Janeway (2013). Plant species encountered during the field surveys are listed in Appendix B.

No special-status vascular plant species have been previously documented from within the study area as indicated by the database queries. Timing of the 2018 field surveys was such that all potentially occurring species included in the database queries would have been identifiable at least to the level of genus, if present. During these surveys, no plant species were encountered that were not identifiable to the level necessary to make determination of significance. The December 2018 field survey was not conducted at a time when all potentially occurring species could definitively identified.

This 2018 field survey revealed the presence of four special-status vascular plant species within the study area, gogwallow starfish (*Hesperevax caulescens*; CNPS Rank 4.2), shield-bracted monkey-flower (*Erythranthe glaucescens*; CNPS Rank 4.3), Tehama navarretia (*Navarretia heterandra*; CNPS Rank 4.3) and Bidwell's knotweed (*Polygonum bidwelliae*; CNPS Rank 4.3). No federal or statelisted plant species were encountered in the surveyed study area, although a single large vernal pool supporting a previously-documented population of Hoover's spurge (*Euphorbia hooveri*) is located just east of the south access road. There are no vernal pools or vernal swales in the surveyed study area.

Hogwallow Starfish

Hogwallow starfish was encountered at one site along the margin of the south access road. Several hundred plants were observed in a single colony. Additional plants were observed beyond the 30-foot survey corridor. It should be noted that the 2017-2018 growing season was well below average with regard to precipitation and timing. During a "normal" rainfall-season, hogwallow starfish may be expressed at additional sites along the south access road (including the northernmost proposed realignment). This species is known from 20 counties in California, including Amador, Alameda, Butte, Contra Costa, Colusa, Fresno, Glenn, Kern, Merced, Monterey, Napa, Sacramento, San Diego, San Joaquin, San Luis Obispo, Solano, Stanislaus, Sutter, Tehama and Yolo. CNPS lists a total of 13 USGS quadrangles from which it is recorded. The species has been assigned a CNPS Rank of 4.2, which means it is uncommon in California and is fairly endangered. It has been assigned a State Rank of S3 and Global Rank of G3, meaning it is "Vulnerable". Hogwallow starfish is threatened by development, agriculture, and possible overgrazing. Other occurrences of this species are encompassed within lands in the vicinity held in conservation easement with The Nature Conservancy (TNC) in their Lassen Foothills Project Area, including locations elsewhere on the Leininger Ranch (J. Dittes, pers. obs.).

Shield-bracted Monkey-flower

Shield-bracted monkey-flower was encountered at scattered sites along the banks of the DCID irrigation ditch, and at a few locations within the floodplain of Deer Creek. This species is known from Shasta, Tehama, Butte, Colusa, Lake and Nevada Counties. It occurs on 32 USGS 7.5-minute quadrangles. Shield-bracted monkey-flower is locally frequent and often abundant along drainages and on seeps associated with the Tuscan volcanic formation between Table Mountain in Butte County and Battle Creek in Shasta County. This species has been assigned a CNPS Rank of 4.3, meaning it is uncommon but not very endangered in California. It has been assigned a State Rank of S3S4 and Global Rank of G3G4, meaning it is "Vulnerable, but apparently Secure". Numerous occurrences are encompassed within lands held in conservation easement with TNC in their Lassen Foothills Project Area (J. Dittes, pers. obs.). CNPS does not list the number of occurrences for this taxon.

Tehama Navarretia

Tehama navarretia was encountered at multiple scattered locations along reaches of both the north and south access roads (including the northernmost proposed realignment). Some of these colonies are situated within the southeast portion of the construction site study area. Colonies ranged from a few individuals to 500+ plants; these are associate with heavier, seasonally-moist soils. This species is known from numerous extant occurrences distributed between Butte, Colusa, Lake, Napa, Shasta, Tehama, Trinity and Yuba Counties in California (17 USGS quadrangles), and from Oregon. CNPS does not list the number of occurrences for this taxon. This species has been assigned a CNPS Rank of 4.3, meaning it is uncommon but not very endangered in California. It has been assigned a State Rank of S4, meaning it is apparently secure in California; with a Global Rank of G4, it is deemed apparently secure, considering occurrences outside of California. Numerous occurrences are encompassed within lands held in conservation easement with TNC in their Lassen Foothills Project Area, including locations elsewhere on the Leininger Ranch (J. Dittes, pers. obs.).

Bidwell's Knotweed

Bidwell's knotweed was encountered at a few scattered sites along a reach of the north access road. Small colonies are associated with relatively barren, thin and rocky soils on the slope above the temporary staging area. This species is known from numerous extant occurrences associated with the Tuscan volcanic formation in Butte, Tehama and Shasta Counties. Although geographically restricted in range, populations are frequent and many of them quite large; the species is recorded from 17 USGS 7.5-minute quadrangles. This species has been assigned a CNPS Rank of 4.3, meaning it is uncommon but not very endangered in California. It has been assigned a State Rank of S4, meaning it is apparently secure in California; with a Global Rank of G4, it is deemed apparently secure, considering occurrences outside of California. Numerous occurrences are

encompassed within lands held in conservation easement with TNC in their Lassen Foothills Project Area, including locations elsewhere on the Leininger Ranch (J. Dittes, pers. obs.).

Designated Critical Habitat for Federally Listed Vernal Pool Plant Species

The south access road, and most of the construction site are included on lands designated by USFWS as Critical Habitat (CH) for four federally listed vernal pool plant species [Hoover's spurge, hairy Orcutt grass (*Orcuttia pilosa*), slender Orcutt grass (*Orcuttia tenuis*) and Greene's tuctoria (*Tuctoria greenei*)]. CHs are specific areas that possess Primary Constituent Elements (PCEs) essential to the conservation of the species that may require special management or protection. CH possessing the PCEs for the four federally listed vernal pool plant species is associated with a portion of lands located on the east side of the south access road. Habitats possessing PCEs are not present at the construction site or north access road study areas.

Invasive Species

Invasive species encountered in the study area include yellow star-thistle, puncture-vine (*Tribulus terrestris*), milk-thistle (*Silybum marianum*), Italian plumeless thistle (*Carduus pycnocephalus*), Klamathweed (*Hypericum perforatum*), Himalayan blackberry and edible fig. All of these species are well-established in the region. There are several other species which are spreading in the region but which were not observed in the study area, including, but not limited to goatgrasses (*Aegilops cylindrica*, *A. triuncialis*), and stinkweed (*Dittrichia graveolens*).

An impact related to Vegetation and Plant Communities would be significant if the project would:

a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the CDFW, USFWS or NMFS;
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the CDFW or USFWS;
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means;
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites;
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance; or
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plans.

The thresholds of significance listed above will be used to evaluate the potential for significant impacts on all of the remaining biological sections including Wildlife, Wetlands and Other Jurisdictional Waters of the U.S., and Fisheries.

No Action Alternative

Under this alternative, no project activities would occur, therefore no impacts would occur to special-status plant species or existing vegetation, and no additional exotic plant species would potentially become established at the site, over and above existing land uses.

Proposed Action Alternative

Under this alternative, the proposed project has potential to directly and indirectly impact populations of hogwallow starfish, shield-bracted monkey-flower, Tehama navarretia and Bidwell's knotweed. Mitigation is generally not required for CNPS List 4 species unless the population has particular conservation significance (e.g., outside of known range, the type locality, morphologically / genetically unique, etc.). All four of these

CNPS Rank 4 species are locally frequent in the region and generally abundant where they occur. Numerous populations of these species occur elsewhere on the Leininger Ranch, which is protected under a conservation easement with TNC. Loss of plants as a result of implementing this alternative would not likely affect the overall viability of these four species. For this reason, this is considered a less than significant impact. However, measures have been incorporated into the proposed project to minimize impacts to these species.

There are no proposed road improvements planned in the immediate vicinity of the large vernal pool which supports a known population of Hoover's spurge and contains PCEs for three additional federally listed plant species and their CHs. However direct and / or indirect impacts could occur to that pool or its sub-watershed if vehicles were not confined to the existing road surface within its sub-watershed. This is considered a potentially significant impact.

Invasive species that do not currently occur at the project site could be brought in on construction equipment, which could allow them to colonize the site. This is considered a potentially significant impact.

There would also be direct and indirect impacts to small areas of mixed riparian woodland / scrub and emergent wetland vegetation. This is considered a potentially significant impact. Some of these impacts and measures to address them are discussed in Section 3.4.7 Wetlands and Other Jurisdictional Waters of the U.S.

A permanent loss of approximately 0.44 acres of vegetation, composed of a combination of riparian and upland species along the diversion ditch would occur as a result of the lining of approximately 1,250 feet of the ditch. This vegetation is periodically /regularly cut and burned by DCID as evidenced by the presence of past cut stumps, burn piles and an analysis of several years of aerial photos. Because of the baseline periodic /regular maintenance of this vegetation, the loss of this vegetation is considered a less than significant impact.

The following measures would be implemented to avoid and minimize impacts to vegetation and plant communities and to mitigate potentially significant impacts listed above to vegetation and plant communities to less than significant levels:

VEGETATION-1: Disturbance to existing vegetation will be avoided or minimized to the extent possible.

VEGETATION-2: Disturbance to riparian vegetation will be avoided or minimized to the extent possible.

VEGETATION-3: A revegetation plan will be prepared in coordination with the landowners to replace impacted riparian wetlands and other woody vegetation by a measure of quantity and quality equal to, or exceeding impacts of the project using appropriate native plant species.

VEGETATION-4: All heavy equipment shall be thoroughly cleaned prior to mobilization onsite to remove any soil, weed seeds and plant parts in order to reduce the importation and spread of invasive exotic plant species.

VEGETATION-5: Only certified weed-free straw shall be used for erosion control or other purposes to reduce the importation and spread of invasive exotic plant species.

VEGETATION-6: Road improvement and grading activities shall be conducted in such a manner that disturbances are confined to the already disturbed road prism.

VEGETATION-7: Vehicle traffic will be limited to the existing disturbed road prism. The condition of the road post-project will be coordinated with the landowners and all measures will be taken to return the road to pre-project conditions. Truck passing and parking areas will be established in areas away from Tehama navarretia, Bidwell's knotweed and hogwallow starfish populations and seasonal wetlands. Truck passing areas will be clearly mapped in the field with high visibility fencing or flagging and all construction personnel will be made aware of the sensitive resources and avoidance measures.

VEGETATION-8: An appropriately-timed preconstruction rare plant survey will be conducted prior to the construction of the two new road segment realignments to ensure that nothing was missed during the winter 2018 rare plant survey.

VEGETATION-9: Disturbance associated with the two new road segment realignments shall be restricted to the degree possible to the new road prism. To the extent possible, truck passing and parking areas associated with the new road prism will be established in areas away from Tehama navarretia and hogwallow starfish populations.

VEGETATION-10: No smoking will be allowed on the construction site or within the project area, for fire prevention purposes.

VEGETATION-11: No road improvements shall occur within the 0.6-mile reach of the south access road within the sub-watershed of the large vernal pool / Hoover's Spurge population.

Signage in both directions and flagging shall be used to clearly indicate the sensitive habitat area bordering the eastern side of the road. All drivers and machinery operators will be made aware of the sensitive resource area and will confine all vehicle / machinery travel to the existing road surface.

3.4.4 Wildlife

3.4.5 Affected Environment

Six habitat types generally occur within the study area as defined by the California Wildlife-Habitat Relationships classification system (Mayer and Laudenslayer 1988). The habitat types include Valley Foothill Riparian, Annual Grassland, Blue Oak Woodland, Valley Oak Woodland, Barren and Riverine (Figure 13). The wildlife that potentially inhabit the area are those species that would normally be expected to use these habitats for food, shelter and cover within the general region (Sacramento valley and foothills).

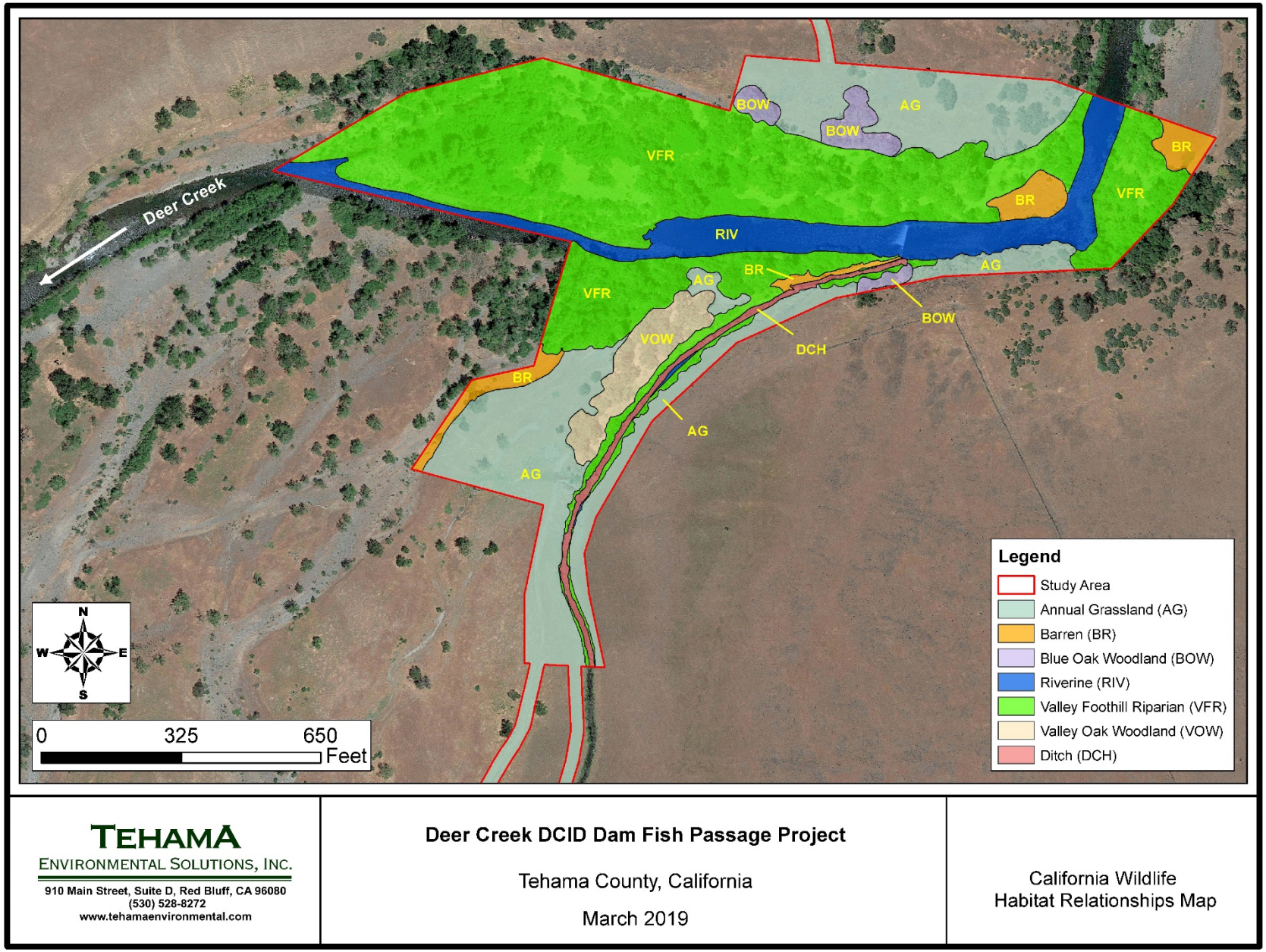
3.4.6 Environmental Consequences / Impacts and Mitigation Measures

Methodology

The assessment of potential impacts of the proposed project on wildlife is based on a review of databases and pertinent literature, consultation with resource agency staff, and field studies that are documented in a *Biological Resources Evaluation* (Tehama Environmental Solutions 2018) that was prepared for the proposed project. This document is available on the Red Bluff Fish and Wildlife Office website on the AFRP webpage (http://www.fws.gov/redbluff/afrp.html).

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

Based on the results of the CNDDB search, the USFWS and NMFS species lists and TES's additional knowledge of the site and local area, a list of potentially occurring special-status species and natural communities was developed for the project and is included as Appendix D. For the purposes of this evaluation, special-status species are defined as:



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Deer Creek DCID Dam Fish Passage Project

Tehama County, California

March 2019

California Wildlife
Habitat Relationships Map

Figure 13. Wildlife Habitat Relationships Map

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.

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

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

An evaluation of the potential presence of special-status species is included in Appendix D. Based on the results of that evaluation, the Biological Resources Evaluation further evaluated the potential impacts of the proposed project on those species with the potential to occur within, or near the proposed project site. Based on that further evaluation, the following special-status wildlife species, groups of species or CHs are known to, or may occur within the project area, and could potentially be significantly impacted by the proposed project:

- Western Pond Turtle *(Emys marmorata)*
- Foothill Yellow-legged Frog *(Rana boylii)*
- Grasshopper Sparrow *(Ammodramus savannarum)*
- Long-eared Owl *(Asio otus)*
- Burrowing Owl *(Athene cunicularia)*
- Swainson's Hawk *(Buteo swainsoni)*
- Northern Harrier *(Circus cyaneus)*
- White-tailed Kite *(Elanus caeruleus)*
- American Peregrine Falcon *(Falco peregrinus anatum)*
- American Bald Eagle *(Haliaeetus leucocephalus)*
- Yellow-breasted Chat *(Icteria virens)*
- Loggerhead Shrike *(Lanius ludovicianus)*
- Yellow Warbler *(Setophaga petechia)*
- Other Nesting Raptors
- Other Nesting Migratory Birds
- Vernal Pool Fairy Shrimp *(Branchinecta lynchi)*

- Valley Elderberry Longhorn Beetle *(Desmocerus californicus dimorphus)*
- Vernal Pool Tadpole Shrimp *(Lepidurus packardi)*
- Designated Critical Habitat for Federally Listed Vernal Pool Faunal Species
- Pallid Bat *(Antrozous pallidus)*
- Ringtail *(Bassariscus astutus)*
- Western Red Bat *(Lasiurus blossevillii)*

Three of these species (vernal pool fairy shrimp, valley elderberry longhorn beetle and vernal pool tadpole shrimp) are federally listed as Threatened or Endangered. CH for two of these species (vernal pool fairy shrimp and vernal pool tadpole shrimp) as well as CH for one additional species (conservancy fairy shrimp [*Branchinecta conservatio*]), is located within the project site. Under Section 7 of the ESA, federal agencies are required to consult with the USFWS regarding impacts from a proposed action to listed species or species proposed for listing, and their designated CH. A *Biological Assessment* (Tehama Environmental Solutions 2019bService) has been prepared for the proposed project and consultation with the USFWS has been initiated.

Western Pond Turtle

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

Foothill Yellow-legged Frog

The foothill yellow-legged frog is currently considered a state candidate for listing as Threatened and a CDFW Species of Special Concern. The main reported threat to the species is predation by introduced aquatic predators including fish and bullfrogs (Jennings and Hayes 1994). This species inhabits shallow flowing water in small to moderate-sized streams with some cobble-sized substrate (Jennings and Hayes 1994) in a variety of habitats including valley-foothill hardwood, valley-foothill hardwood-conifer, valley-foothill riparian, ponderosa pine, mixed conifer, coastal scrub, mixed chaparral and wet meadow from sea level to 6,000 feet in elevation (Ziener et al. 1988). Breeding occurs following the end of spring flooding from mid-March to May (Ziener et al. 1988). Adults forage on aquatic and terrestrial invertebrates and are rarely found far from permanent water (Ziener et al. 1988). Foothill yellow-legged frogs are documented to occur in Deer Creek approximately 15 river miles upstream of the study area (California Department of Fish and Wildlife 2018), M. Johnson pers. comm). Potential habitat is present in Deer Creek within the study area. This species was not observed during TES site surveys. No foothill yellow-legged frogs or egg masses were observed during CDFW focused foothill yellow-legged frog egg mass site surveys conducted in April and May of 2018 (P. Bratcher pers. comm.).

Grasshopper Sparrow

The grasshopper sparrow is a CDFW Species of Special Concern. Reported potential threats to the species include urbanization, expansion of vineyards and fire suppression, if any of these leads to grassland converting into unsuitable habitats such as dense scrub (Shuford and Gardali 2008). The grasshopper

sparrow is more likely to be found in large tracts of habitat than in small ones. Minimum area requirements are approximately 100 hectares (247 acres) in Maine and 30 hectares (74 acres) in Illinois. In general, grasshopper sparrows in California prefer short to middle-height, moderately open grasslands with scattered shrubs (Shuford and Gardali 2008). The breeding season for this species extends from mid-March to August. This species builds nests domed with grasses and forbs with a side entrance, in a slight depression in the ground, hidden at the base of an overhanging clump of grasses or forbs, with the rim approximately level to the ground (Shuford and Gardali 2008). The grasshopper sparrow diet is roughly 63 percent animal matter (mainly grasshoppers) and 37 percent vegetable (plants / seeds), and they forage primarily on the ground (bare ground is critical microhabitat for effective foraging) or from low vegetation (Shuford and Gardali 2008). Grassland habitat along the access routes provides potential nesting and foraging habitat for this species. Grasshopper sparrows were not observed during site surveys.

Long-eared Owl

The long-eared owl is designated as a Species of Special Concern by CDFW. Declines in long-eared owl populations have been attributed to destruction of lowland riparian woodland habitats, however other unknown factors such as automobile collisions and human harassment may also be contributing factors (Remsen 1978). This species nests and roosts in riparian, live oak or other thickets with small, densely-canopied trees, and primarily hunts in open areas for rodents, as well as birds, smaller owls and other vertebrates (Zeiner et al. 1990a). Breeding occurs from early March to late July (Zeiner et al. 1990a). Long-eared owls may nest in the riparian areas or dense upland woodlands within and near the study area. This species was not observed during site surveys.

Burrowing Owl

The burrowing owl is a CDFW Species of Special Concern. Population declines are attributed to conversion of grassland to agriculture, other habitat destruction and poisoning of ground squirrels (Remsen 1978). Collisions with automobiles may also be a significant cause of mortality. Burrowing owls are yearlong residents of open, dry grassland, desert habitats and open shrub stages of pinyon-juniper and ponderosa pine habitats. This species eats mostly insects, small mammals, reptiles, birds and carrion. They use ground squirrel or other burrows for roosting and nesting cover, or they may dig their own burrow in soft soil. Burrowing owls are not likely to nest within the study area due to a lack of nesting habitat, however potential nesting, roosting and foraging habitat for this species occurs near the study area within the grasslands located adjacent to the access haul roads. No burrowing owls or potential burrows were observed during site surveys.

Swainson's Hawk

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

species was observed during site surveys and an active nest was observed approximately one mile from the project study area.

Northern Harrier

The northern harrier is a CDFW Species of Special Concern. Reported threats to the species include destruction of marsh habitat, burning and plowing of nesting areas and grazing in grassland nesting habitat (Remsen 1978, Zeiner et al. 1990a). This species nests from April to September on the ground in emergent wetlands, grasslands, agricultural fields or on sagebrush flats (Zeiner et al. 1990a). They forage in open areas consuming small mammals, birds, frogs, small reptiles, crustaceans, insects and rarely, fish (Zeiner et al. 1990a). Northern harriers are not likely to nest within the study area due to a lack of nesting habitat, however potential nesting and foraging habitat for this species occurs near the study area within the grasslands located adjacent to the access haul roads. Northern harriers were observed near the study area during site surveys.

White-tailed Kite

The white-tailed kite is designated as a Fully Protected species under the California Fish and Game Code. The species has extended its range and increased in numbers in recent decades (Zeiner et al. 1990a). They are rarely found away from agricultural areas and nest from February to October near the tops of trees in dense oak, willow or other tree stands, near open foraging areas (Zeiner et al. 1990a). They forage on small mammals and occasionally on birds, insects, reptiles and amphibians in undisturbed open grasslands, meadows, farmlands and emergent wetlands (Zeiner et al. 1990a). Potential nesting habitat is present within the study area. White-tailed kites were not observed during field surveys.

American Peregrine Falcon

The American peregrine falcon is designated as a Fully Protected species under the California Fish and Game Code. The species was previously listed as Endangered by the State of California and was delisted in 2009. The species was originally listed as Endangered by USFWS and was delisted in 1999. Declines in population associated with this species are attributed primarily to dichlorodiphenyltrichloroethane (DDT) contamination (Zeiner et al. 1990a). Riparian areas and coastal and inland wetlands are important habitats year-long, especially in non-breeding seasons. They require protected cliffs and ledges for cover. They breed near wetlands, lakes, rivers or other waters, and nest on cliff ledges, human structures and occasionally, in cavities in large snags and old nests from other raptors. The American peregrine falcon feeds primarily on birds including ducks, and also takes mammals and fish. There is a lack of nesting habitat within the study area, due to the lack of cliffs or other suitable nesting habitat, however there may be potential nesting habitat in the vicinity of the study area associated with high voltage power line towers near the north and south access roads. Peregrine falcons were observed during site surveys.

American Bald Eagle

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

area. No American bald eagle nesting activity is known to occur in the general area, however potential still exists for new nesting territories to be established. American bald eagles were observed during site surveys.

Yellow-breasted Chat

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

Loggerhead Shrike

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

Yellow Warbler

The yellow warbler is designated as a CDFW Species of Special Concern. Threats to the species include destruction of riparian habitat and nest parasitism by brown-headed cowbirds (Remsen 1978). Numbers of breeding pairs have declined dramatically in recent decades in lowland areas. Yellow warblers are neotropical migrant songbirds that nest in riparian woodlands as well as in montane chaparral and in the shrubby understory of ponderosa pine and mixed conifer forests (Zeiner et al. 1990a, Shuford and Gardali 2008). They nest from mid-April into early August, with peak nesting activity in June, and eat insects, spiders and occasionally berries (Zeiner et al. 1990a). Potential nesting habitat is present in the riparian areas within the study area. No yellow warblers were observed during site surveys.

Other Nesting Raptors

Nesting habitat exists within, and near the project site for several other raptor species (eagles, hawks and owls) that are not identified as special-status species, but are protected under several sections of the California Fish and Game Code. Several raptor species were observed during site surveys (Appendix D). A number of additional raptor species, while not observed, may potentially nest within, or near the study area. Several large and medium-sized nests were observed within, or in the vicinity of the study area that could potentially serve as raptor nests.

Other Nesting Migratory Birds

Nesting habitat exists within the project site for a number of migratory bird species that are not identified as special-status species, but are protected under the federal Migratory Bird Treaty Act and / or under several sections of the California Fish and Game Code (California Department of Fish and Wildlife and California Attorney General 2018).

Vernal Pool Fairy Shrimp

The vernal pool fairy shrimp was listed as Threatened by USFWS on September 19, 1994. CH was initially designated on August 6, 2003. Additional CH was designated on February 10, 2006. Population declines are attributed to destruction and degradation of vernal pool habitats. Vernal pool fairy shrimp occur exclusively in vernal pool and vernal pool-like habitats. Although the species has been collected from larger pools, it generally tends to occur in smaller pools less than 0.05 acres and is typically found in pools with low to moderate salinity or total dissolved solids (U.S. Fish and Wildlife Service 2005). Vernal pool fairy shrimp eggs, or cysts, remain dormant in the soil when the pools are dry and several separate hatches can occur in a single wet season. Adults can reach sexual maturity in as few as 18 days at optimal water temperatures and feed on algae, bacteria, protozoa, rotifers and detritus (U.S. Fish and Wildlife Service 2005). A portion of the study area is located within currently designated CH for vernal pool fairy shrimp including the south access road, a small portion of the north access road and the southern portion of the construction area (U.S. Fish and Wildlife Service 2018b). Vernal pool fairy shrimp were not observed during surveys, however full protocol-level surveys were not conducted.

Valley Elderberry Longhorn Beetle

The valley elderberry longhorn beetle (VELB) was federally listed as a Threatened species by USFWS on August 8, 1980. CH was designated by USFWS on August 8, 1980. Suggested threats to the existence of this species include loss of elderberry shrubs and associated riparian habitat, pesticide use, grazing and other mismanagement of riparian habitat. Current recovery efforts are primarily focused on revegetating riparian habitats. The VELB is endemic to the Central Valley of California. They are associated with elderberry *(Sambucus spp.)* shrubs during their entire life cycle. VELB larvae bore into and feed on the pithy core of elderberry stems for up to two years before emerging as adults after chewing an exit hole through the stem and bark. The adult beetles feed on elderberry foliage until they mate in early summer. The female then lays eggs in crevices in the bark of the elderberry plant. The project site is not located in, or near the currently designated CH but is located within the known range of the species. Suitable habitat (elderberry shrubs with stems greater than, or equal to, one inch in diameter) exists within the study area. No exit holes were observed during surveys.

Vernal Pool Tadpole Shrimp

The vernal pool tadpole shrimp was listed as Endangered by USFWS on September 19, 1994. CH was initially designated on August 6, 2003. Additional CH was designated on February 10, 2006. Population declines are attributed to destruction and degradation of vernal pool habitats. Vernal pool tadpole shrimp occur in a wide variety of ephemeral habitats and have been collected in pools ranging in size from 6.5 square feet to 88 acres (U.S. Fish and Wildlife Service 2005). Vernal pool tadpole shrimp eggs, or cysts, remain dormant in the soil when the pools are dry and hatch in as few as four days after winter rains fill the vernal habitats (U.S. Fish and Wildlife Service 2005). Adults reach sexual maturity in three to four weeks and females can deposit as many as six clutches of eggs in a single wet season (U.S. Fish and Wildlife Service 2005). They feed on organic debris and living organisms such as fairy shrimp and other invertebrates (U.S. Fish and Wildlife Service 2007). A portion of the study area is located within the currently designated CH for vernal pool tadpole shrimp including the south access road, a small portion of the north access road and the southern portion of the construction area (U.S. Fish and Wildlife Service 2018b). Vernal pool tadpole shrimp were not observed within the study area during surveys, however full protocol-level surveys were not conducted. Potential habitat is present in seasonal wetlands and seasonally-wet depressions within the south access road. Site surveys of a large vernal pool near the south access road, but outside of the study area, detected vernal pool tadpole shrimp (Eggeman 2018).

Designated Critical Habitat for Federally Listed Vernal Pool Faunal Species

The south access road, and most of the construction site are included on lands designated by USFWS as CH for three federally listed vernal pool faunal species (conservancy fairy shrimp, vernal pool fairy shrimp and vernal pool tadpole shrimp). Habitat possessing the PCEs for vernal pool fairy shrimp and vernal pool tadpole shrimp are present in the south access road and the large vernal pool in the vicinity of the south access road. Habitat possessing the PCEs for conservancy fairy shrimp is not present in the project site but is present in the large vernal pool in the vicinity of the south access road.

Pallid Bat

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

Ringtail

The ringtail is designated as a Fully Protected species under the California Fish and Game Code. Threats to the species include urbanization and loss and degradation of riparian communities (Williams 1986). This medium-sized carnivore inhabits forests and shrublands in close association with riparian habitats or rocky areas. They are usually found within 0.6 miles of permanent water (Zeiner et al. 1990b) in low to middle elevations. Ringtails den and nest in hollow trees, snags, cavities in rocks, abandoned burrows and human structures. Ringtail primarily feed on rodents and rabbits and also birds and eggs, reptiles, invertebrates, fruits, nuts and some carrion. There is a potential for ringtails to be denning in riparian habitats within the study area. No ringtails were observed during site surveys, however they are seldom observed without the use of specialized survey methods due to their strongly nocturnal nature.

Western Red Bat

The western red bat is designated as a CDFW Species of Special Concern. Potential threats to this species include loss of riparian habitat from habitat conversions and fatalities from wind turbines. Their roosting habitat includes forests and woodlands, ranging from sea level to mixed conifer forests. They roost in foliage near edge habitats adjacent to streams, fields or urban areas in trees (Zeiner et al. 1990b). The western red bat hibernates in the winter and is generally considered a solitary species. They feed over a wide variety of habitats including grasslands, shrublands, open woodlands and forests, and croplands. They are nocturnal and feed primarily on insects such as moths, crickets, beetles and cicadas. Breeding occurs in August and September and, after delayed fertilization, females give birth between late May and early July. Western red bats may use suitable habitat (riparian forest) within or near the project site for roosting or foraging. Potential roosting habitat is present in riparian habitats within the study area. This species was not detected within the study area during acoustical site surveys.

No Action Alternative

Under this alternative, there would be no impacts to wildlife, including special-status wildlife species because the project would not be implemented. Baseline levels of disturbance to wildlife populations as a result of farming, ranching and diversion maintenance activities would continue to occur at current levels.

Proposed Action Alternative

Under this alternative, activities from the proposed project would potentially cause significant impacts to the following species. Project activities that could cause significant impacts include people and equipment working at the project site, vegetation removal and noise from construction activities.

Western Pond Turtle

Under this alternative, western pond turtles could be harmed or killed if they were present within the project area during construction activities. This is considered a potentially significant impact.

Foothill Yellow-legged Frog

Under this alternative, foothill yellow-legged frog could be harmed or killed if they were present within the project area during construction activities. This is considered a potentially significant impact.

Grasshopper Sparrow

Under this alternative, project activities could cause nests to be destroyed or abandoned if active grasshopper sparrow nests were present within or near the project area during construction activities. This is considered a potentially significant impact.

Long-eared Owl

Under this alternative, project activities could cause nests to be destroyed or abandoned if active long-eared owl nests were present within or near the project area during construction activities. This is considered a potentially significant impact.

Burrowing Owl

Under this alternative, project activities could cause nests or burrows to be destroyed or abandoned if active burrowing owl burrows were present within or near the project area during construction activities. This is considered a potentially significant impact.

Swainson's Hawk

Under this alternative, project activities could cause nests to be destroyed or abandoned if active Swainson's hawk nests were present within or near the project area during construction activities. This is considered a potentially significant impact.

Northern Harrier

Under this alternative, project activities could cause nests to be destroyed or abandoned if active northern harrier nests were present within or near the project area during construction activities. This is considered a potentially significant impact.

White-tailed Kite

Under this alternative, project activities could cause nests to be destroyed or abandoned if active white-tailed kite nests were present within or near the project area during construction activities. This is considered a potentially significant impact.

American Peregrine Falcon

Under this alternative, project activities could cause nests to be destroyed or abandoned if active American peregrine falcon nests were present within or near the project area during construction activities. This is considered a potentially significant impact.

American Bald Eagle

Under this alternative, project activities could cause harassment, habitat modification or nest abandonment if active American bald eagle nests were present within or near the project area during construction activities. This is considered a potentially significant impact. Beneficial effects to this species could occur as a result of

the proposed alternative from the potential increase in prey abundance, as a result of improved salmonid and other native fish species.

Yellow-breasted Chat

Under this alternative, project activities could cause nests to be destroyed or abandoned if active yellow-breasted chat nests were present within or near the project area during construction activities. This is considered a potentially significant impact.

Loggerhead Shrike

Under this alternative, project activities could cause nests to be destroyed or abandoned if active loggerhead shrike nests were present within or near the project area during construction activities. This is considered a potentially significant impact.

Yellow Warbler

Under this alternative, project activities could cause nests to be destroyed or abandoned if active yellow warbler nests were present within or near the project area during construction activities. This is considered a potentially significant impact.

Other Nesting Raptors

Under this alternative, project activities could cause nests to be destroyed or abandoned if other active raptor nests were present within or near the project area during construction activities. This is considered a potentially significant impact.

Other Nesting Migratory Birds

Under this alternative, project activities could cause nests to be destroyed or abandoned if other active migratory bird nests were present in the project vicinity during construction activities. This is considered a potentially significant impact.

Vernal Pool Fairy Shrimp

Under this alternative, vernal pool fairy shrimp could be impacted through mortality to cysts through destruction or modification of potential habitat that is present in seasonal wetlands and seasonally-wet depressions within the south access road. A significant increase in traffic would occur during project construction as a result of equipment and material hauling and personnel mobilization traffic. Potential impacts include filling of the pools or changes in hydrology due to road grading, and movement of cysts out of pool habitats due to erosion of the pool sediments following construction. Additional potential impacts include contamination of the pool sediments from petroleum products or other contaminant spills. This is considered a potentially significant impact.

Valley Elderberry Longhorn Beetle

Under this alternative, VELB could be impacted through harassment, modifications to suitable habitat and injury or mortality from project construction activities, if they were present within the project site during construction activities. Suitable habitat for this species is present within 100 feet of the proposed project construction activities. Potential activities that could impact this species include direct disturbance to existing elderberry shrubs, disturbance within 100 feet of the drip line of the elderberry shrubs or impacts from dust. This is considered a potentially significant impact.

Vernal Pool Tadpole Shrimp

Under this alternative, potential impacts to vernal pool tadpole shrimp and their cysts are expected to be similar to those described above for vernal pool fairy shrimp. This is considered a potentially significant impact.

Designated Critical Habitat for Federally Listed Vernal Pool Faunal Species

Under this alternative, potential impacts could occur to designated CH that contains PCEs for vernal pool fairy shrimp and vernal pool tadpole shrimp within the south access road due to construction traffic and road improvements. This is considered a potentially significant impact. Direct and / or indirect impacts could occur to the large vernal pool in the vicinity of the south access road if vehicles were not confined to the existing road surface within its sub-watershed. This is considered a potentially significant impact.

Pallid Bat

Under this alternative, project activities could cause pallid bats to abandon their roost if bats were roosting within, or in close proximity to the project site. This is considered a potentially significant impact.

Ringtail

Under this alternative, ringtail could be harmed or killed if active ringtail dens or nests were present within the project sites and were disturbed by project construction activities. This is considered a potentially significant impact.

Western Red Bat

Under this alternative, project activities could cause juvenile western red bats to be harmed or killed if active maternal roosts were present in vegetation impacted by construction activities. This is considered a potentially significant impact.

There are no adopted habitat conservation plans, natural community conservation plans or other conservation plans in the project area. The proposed project would not be in conflict with any local policies or ordinances protecting biological resources.

The following measure would be implemented to avoid and minimize impacts to wildlife and to mitigate potentially significant impacts listed above to wildlife to less than significant levels:

WILDLIFE-1: Within ten (10) calendar prior to the onset of potentially disturbing construction activities, areas that will be disturbed within 100 feet of water bodies shall be surveyed by a qualified biologist to determine if any western pond turtles or turtle nests are present. If any turtles or turtle nests are found, a qualified and permitted biologist shall determine and implement appropriate relocation procedures, in coordination with CDFW. The site shall be checked daily by trained construction workers prior to work commencing, including underneath vehicles and equipment that will be used. If turtles are found, they will be moved by a qualified and permitted biologist to an area of safety out of harm's way.

WILDLIFE-2: Within ten (10) calendar days prior to work in aquatic habitats, water bodies shall be surveyed by a qualified biologist to determine if any foothill yellow-legged frogs are present. If any foothill yellow-legged frogs are found, a qualified and permitted biologist shall determine and implement appropriate relocation procedures, in coordination with CDFW. The site shall be checked daily by trained construction workers prior to work commencing, including underneath vehicles and equipment that will be used. If foothill yellow-legged frogs are found, they will be moved by a qualified and permitted biologist to an area of safety out of harm's way.

WILDLIFE-3: Any tree removal, vegetation clearing, or the onset of potentially disturbing construction activities shall 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). Note: Also see measure WILDLIFE-4.

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 shall be conducted by a qualified biologist no more than seven (7) days prior to the initiation of the onset of these activities or as appropriate survey protocols require. If active raptor nests are found to be present, tree removal, vegetation clearing and the onset of potentially disturbing construction

activities shall 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 shall commence within the buffer area until the qualified biologist determines that the young birds have fledged or the nest is no longer active.

Construction activities shall occur continuously (not including weekends) until the end of the nesting season to discourage raptors from initiating nesting. If construction activities cease for more than seven (7) consecutive days (including weekends), all construction activities shall cease until CDFW can be consulted to determine if a subsequent raptor nesting survey must be performed.

Active or inactive nests are not to be disturbed or removed as a result of construction activities without CDFW consultation per Fish and Game Code Section 3503.5.

WILDLIFE-4: Any tree removal, vegetation clearing, or the onset of potentially disturbing construction activities shall occur between August 1 and March 1 (outside of the nesting season for grasshopper sparrow, yellow-breasted chat, loggerhead shrike, yellow warbler and other nesting migratory birds). Note: Also see measure WILDLIFE-3.

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 shall be conducted by a qualified biologist no more than seven (7) days prior to the initiation of the onset of these activities. If active bird nests are found to be present, tree removal, vegetation clearing and the onset of potentially disturbing construction activities shall 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 shall commence within the buffer area until the qualified biologist determines that the young birds have fledged or the nest is no longer active.

Construction activities shall occur continuously (not including weekends) until the end of the nesting season to discourage avian species from initiating nesting. If construction activities cease for more than seven (7) consecutive days (including weekends), all construction activities shall cease until CDFW can be consulted to determine if a subsequent nesting bird survey must be performed.

Active nests are not to be disturbed or removed as a result of construction activities per Fish and Game Code Section 3503.

WILDLIFE-5: Prior to the onset of potentially disturbing construction activities, a Swainson's hawk nesting survey of the construction area and adjacent suitable habitat shall be conducted by a qualified biologist in accordance with the protocols in *Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley* (Swainson's Hawk Technical Advisory Committee 2000). If active Swainson's hawk nests are found to be present, the onset of potentially disturbing construction activities shall 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 shall commence within the buffer area until the qualified biologist determines that the nest is no longer active.

WILDLIFE-6: Within seven (7) calendar days prior to the onset of potentially disturbing construction activities, a burrowing owl nesting / roosting survey of the construction area and adjacent suitable habitat shall be conducted by a qualified biologist. If active burrowing owl burrows are found to be present, the onset of potentially disturbing construction activities shall be suspended until a qualified biologist, in consultation with CDFW, can establish an appropriate protective buffer area to minimize impacts to the nesting / roosting birds. No construction activities shall commence within the buffer area until the qualified biologist determines that the burrow is no longer active.

WILDLIFE-7: Prior to any vegetation removal, a survey of the vegetation to be removed shall be conducted by a qualified biologist to ensure that pallid bats are not roosting in the area to be removed.

If pallid bats are found to be roosting within the vegetation to be removed, these activities shall be suspended until a qualified biologist, in consultation with CDFW, can establish appropriate measures to minimize impacts to this species. Examples of measures would include tree removal over several days, removal at night after bats have emerged, delayed removal until after the maternity season, etc.

WILDLIFE-8: All vegetation clearing within potential western red bat roosting habitat (woody riparian habitat with mature trees) shall occur between August 31 and May 1, in order to minimize the likelihood of injuring or killing juvenile bats during the period when they are still unable to fly.

As it relates to bats only, tree removal may occur prior to August 31 based upon a site-specific tree removal plan approved by CDFW. The plan shall consider or include the following:

Monitoring of the affected trees shall be conducted using bat detection equipment within five (5) calendar days of tree removal. If red bats are not present, tree removal can proceed. If red bats are present, a survey on the night prior to tree removal may help confirm the use of that tree by red bats. If red bats are potentially using the tree, a qualified biologist shall monitor removal / trimming of trees that provide suitable red bat roosting habitat. Prior to tree removal / trimming, each tree shall be shaken gently, and several minutes shall pass before felling trees or limbs to allow red bats time to arouse and leave the tree. The biologist shall search downed vegetation for dead or injured red bats and report any dead or injured special-status bat species to CDFW. All bat observations should be reported to CDFW.

WILDLIFE-9: Prior to construction, a qualified biologist will inspect the project site for signs of denning by ringtails.

If ringtails are found to be denning, construction activities will be suspended until a qualified biologist, in consultation with CDFW, can establish appropriate measures to protect ringtail.

WILDLIFE-10: The USFWS shall 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. All protective measures imposed by USFWS through the consultation shall be adhered to.

WILDLIFE-11: To reduce potential impacts to the valley elderberry longhorn beetle (VELB) to less than significant levels, the proposed project shall comply with the current USFWS *Framework for Assessing Impacts to the Valley Elderberry Longhorn Beetle (Desmocerus californicus dimorphus)* (U.S. Fish and Wildlife Service 2017).

WILDLIFE-12: Prior to construction, all elderberry shrubs to be avoided within 150 feet of any project activity will be clearly flagged, marked and maintained throughout construction in order to avoid impacts to the valley elderberry longhorn beetle. All elderberry shrubs to be avoided within 100 feet of project activity will be marked with high-visibility orange fencing.

WILDLIFE-13: Project activities shall avoid direct impacts to seasonal wetlands or other potential large branchiopod (fairy shrimp, tadpole shrimp) habitats, to the extent possible.

High-visibility fencing shall be installed in areas where equipment will be working near any potential large branchiopod habitat that is not to be disturbed.

No road grading or road improvements shall be allowed in or, where feasible, near potential large branchiopod habitat that is not to be disturbed.

All transporters of potentially hazardous materials (fuel, oil, cement, etc.) will be notified as to the presence of potential large branchiopod habitats, and be required to inspect their vehicles prior to entry and exit of the project site 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 potential large branchiopod habitat.

WILDLIFE-14: For potential large branchiopod habitat that cannot be avoided within the existing roads, a layer of geotextile material will be placed across the entire pool bottom up to the edge of the depression. 0.5- to 2-inch diameter gravel or rock will be used to fill the basin up to a level surface with the surrounding road elevation. Gravel / rock fill will be placed prior to the onset of construction and will be maintained throughout the project. After construction is completed, the gravel / rock and geotextile material shall be removed and the pool will be left in pre-project conditions.

WILDLIFE-15: A qualified biologist (biological monitor) shall regularly inspect construction-related activities to ensure that no unnecessary disturbance to special-status species and / or their associated habitats occurs. The biological monitor shall 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 CDFW, USFWS and / or NMFS immediately.

WILDLIFE-16: Prior to the onset of construction activities, a construction worker education program shall be implemented that includes an explanation of all special-status animal species, identification, avoidance measures, and federal and state laws that protect the species. This shall include, at a minimum, those species listed in the environmental documents.

WILDLIFE-17: All food-related trash will be disposed of in closed containers and removed from the project area daily during the construction period. Construction personnel will not feed or otherwise attract wildlife to the project area.

WILDLIFE-18: No pets will be allowed within the project area.

3.4.7 Wetlands and Other Jurisdictional Waters of the U.S.

3.4.8 Affected Environment

Wetlands and other potentially jurisdictional waters of the U.S. (other waters) are present within the project area, associated with Deer Creek, ephemeral drainages and human-made features associated with the diversion system that carries the water diverted by DCID. Based on the presence / absence of indicators of wetland hydrology, hydrophytic vegetation and hydric soils, 8.56 acres of potentially jurisdictional wetlands were identified. Based on the presence of an OHWM, 4.09 acres of potentially jurisdictional other waters of the U.S. were also identified and delineated. Table 3 presents a summary of the total acreage of the jurisdictional waters of the U.S.

Wetlands

Riparian Wetland

The Riparian Wetland (RW) features are present on stream bank, floodplains and overflow channels associated with Deer Creek (Figure 15). The vegetation varies by location within the study area. On the floodplains, the woody dominants include Fremont cottonwood, California sycamore, valley oak and California grape. On the perennial stream and overflow channel margins, the woody dominants include white alder, Goodding's black willow, narrow-leaved willow, arroyo willow and buttonbush. The dominant woody vine species include, California pipevine and Himalayan blackberry. Native herbaceous dominants include rice cutgrass, mugwort and deergrass.

Seasonal Wetland / Disturbed Seasonal Wetland

The Seasonal Wetland (SW) features are present primarily associated with the south access road (Figure 15, Figure 16 and Figure 17). They tend to be dominated by ryegrass and Mediterranean barley. Common subdominants include annual hair grass, stalked popcorn-flower, cut-leaved plantain *(Plantago coronopus)* and toad rush. A number of these features are located, or partially located within the southern access road where they are devoid of vegetation. These features are classified as Disturbed Seasonal Wetlands (DSW).

Ditch / Wet Meadow Complex

The Ditch / Wet Meadow Complex (Ditch / WM) features (Figure 17) are dominated by pale spikerush, hawkbit, hyssop loosestrife and ryegrass. The wetter edges of the complex are dominated by common monkeyflower, dallisgrass, low mannagrass, sticktight and white-tipped clover. The margins of the Ditch feature (Figure 15) are dominated by arroyo willow, white alder and deergrass. Routine maintenance of the ditch and vegetation is evident.

Other Waters of the U.S.

Perennial Stream

A perennial stream is present within the channel of Deer Creek. The creek channel is primarily devoid of vegetation, but the exposed barren rock and gravel along both banks of the stream support a continguous band of woody riparian vegetation except where rock outcrops on the stream banks.

Ephemeral Stream

One ephemeral stream is present and drains into Deer Creek from the north. This stream does not support riparian vegetation and is lined by blue oak and western juniper.

Ditch

The ditch system represents potentially jurisdictional waters of the U.S. due to the fact that it carries water from and / or to a jurisdictional feature (Deer Creek). The ditch is regularly maintained but does support woody vegetation along the banks in some reaches.

Table 3. Summary of Preliminary Delineated Waters of the U.S.

Wetlands	Total Acreage
Seasonal Wetland	0.01
Disturbed Seasonal Wetland	0.02
Ditch / Wet Meadow Complex	0.04
Riparian Wetland	8.50
Total Wetlands	8.56
Other Waters	**Total Acreage**
Ditch	0.43
Ephemeral Stream	0.08
Perennial Stream	3.59
Total Other Waters	4.09
TOTAL WATERS OF THE U. S.	**12.66**

3.4.9 Environmental Consequences / Impacts and Mitigation Measures

Methodology

The assessment of potential impacts of the proposed project on wetlands and other jurisdictional waters of the U.S. is based on consultations with resource agency staff and field studies that are documented in a

Revised Delineation of Waters of the U.S. (Tehama Environmental Solutions 2019) that was prepared for the proposed project. This document is available on the Red Bluff Fish and Wildlife Office website on the AFRP webpage (http://www.fws.gov/redbluff/afrp.html).

A delineation of waters of the U.S. was conducted within the study area on May 9, 11, 16, 18 and 23, 2018, June 19 and 22, 2018 and December 19, 2018 by Mr. Souza and Ms. Mills of TES and Mr. Dittes of Dittes and Guardino Consulting. The delineation was conducted in accordance with the *1987 Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0)* (U.S. Army Corps of Engineers 2008) using a Routine Determination Method. Based on the results of the delineation, maps of all identified wetlands and other waters were prepared. The maps are considered preliminary until they are verified by the USACE. These features and measurements are shown in Table 4.

No Action Alternative

Under this alternative, there would be no impacts to wetlands or other waters. The fish passage improvement structure would not be constructed in Deer Creek. The existing diversion ditch elevation would not be lowered. The existing fish screen and juvenile fish bypass pipe would not be replaced.

Proposed Action Alternative

Under this alternative, as a result of the modifications to the DCID structures, some of the wetland and other waters of the U.S. features would be temporarily and permanently impacted as represented in Table 4. This is considered a potentially significant impact.

Table 4. Impact to Preliminary Waters of the U.S. Deer Creek DCID Dam Fish Passage Project

Impacts (acres)	Wetlands		Other Waters		Totals
Type	Riparian Wetland	Disturbed Seasonal Wetland	Perennial Stream	Ditch	
Temporary	2.81	0.01	0.28	0.01	3.10
Permanent	0.19	0.00	0.40	0.38	0.97
Project Totals	**3.00**	**0.00**	**0.68**	**0.39**	**4.07**

While some impacts associated with the roughened ramp and ditch lining would be permanent, no loss of wetlands would occur. All impacted riparian wetlands would be revegetated. Beneficial impacts to the Deer Creek aquatic system would occur as a result of the improvement in upstream and downstream passage conditions for anadromous salmonids, Pacific lamprey and other native species.

The following measures would be implemented to avoid and minimize impacts to wetlands and other jurisdictional waters of the U.S. and to mitigate potentially significant impacts listed above to wetlands and other jurisdictional waters of the U.S. to less than significant levels:

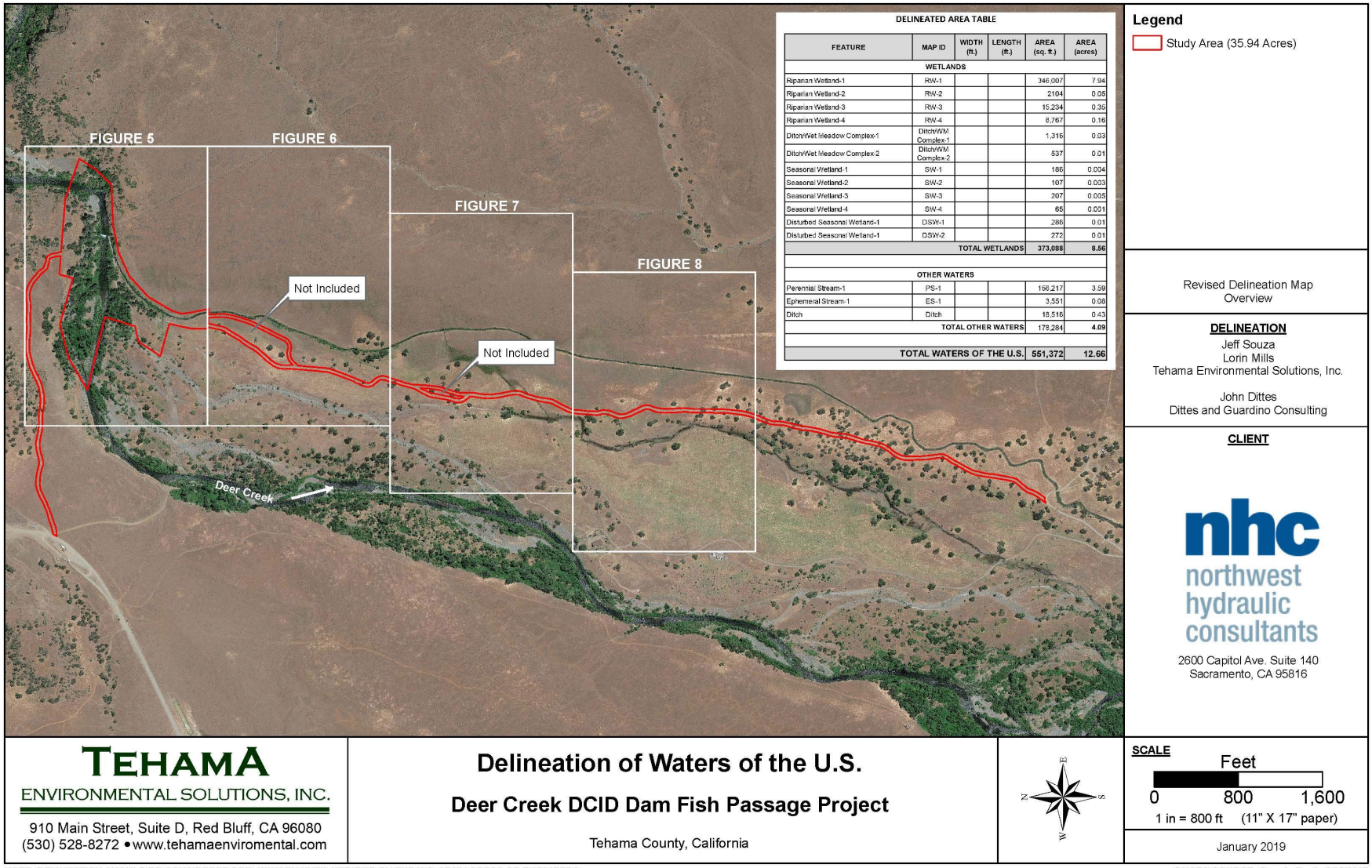
WETLAND-1: Project activities will avoid impacts to wetlands and other aquatic habitats to the extent possible.

WETLAND-2: High-visibility fencing will be installed in areas where equipment will be working near any wetlands or other aquatic habitats that are not to be disturbed.

WETLAND-3: Construction crews will be informed about the importance of avoiding sensitive areas, including wetlands.

WETLAND-4: A Clean Water Act Section 404 Permit will be obtained from the U.S. Army Corps of Engineers and a Clean Water Act Section 401 Certification will be obtained from the Central Valley Regional Water Quality Control Board (RWQCB).

WETLAND-5: A California Fish and Game Code Section 1600 Lake or Streambed Alteration Agreement will be obtained from CDFW.



DELINEATED AREA TABLE

FEATURE	MAP ID	WIDTH (ft.)	LENGTH (ft.)	AREA (sq. ft.)	AREA (acres)
WETLANDS					
Riparian Wetland-1	RW-1			346,007	7.94
Riparian Wetland-2	RW-2			2104	0.05
Riparian Wetland-3	RW-3			15,234	0.35
Riparian Wetland-4	RW-4			6,767	0.16
Ditch/Wet Meadow Complex-1	Ditch/WM Complex-1			1,316	0.03
Ditch/Wet Meadow Complex-2	Ditch/WM Complex-2			537	0.01
Seasonal Wetland-1	SW-1			186	0.004
Seasonal Wetland-2	SW-2			107	0.003
Seasonal Wetland-3	SW-3			207	0.005
Seasonal Wetland-4	SW-4			65	0.001
Disturbed Seasonal Wetland-1	DSW-1			286	0.01
Disturbed Seasonal Wetland-1	DSW-2			272	0.01
TOTAL WETLANDS				373,088	8.56
OTHER WATERS					
Perennial Stream-1	PS-1			156,217	3.59
Ephemeral Stream-1	ES-1			3,551	0.08
Ditch	Ditch			18,516	0.43
TOTAL OTHER WATERS				178,284	4.09
TOTAL WATERS OF THE U.S.				551,372	12.66

Figure 14. Delineation of the Waters of the U.S. Overview Map

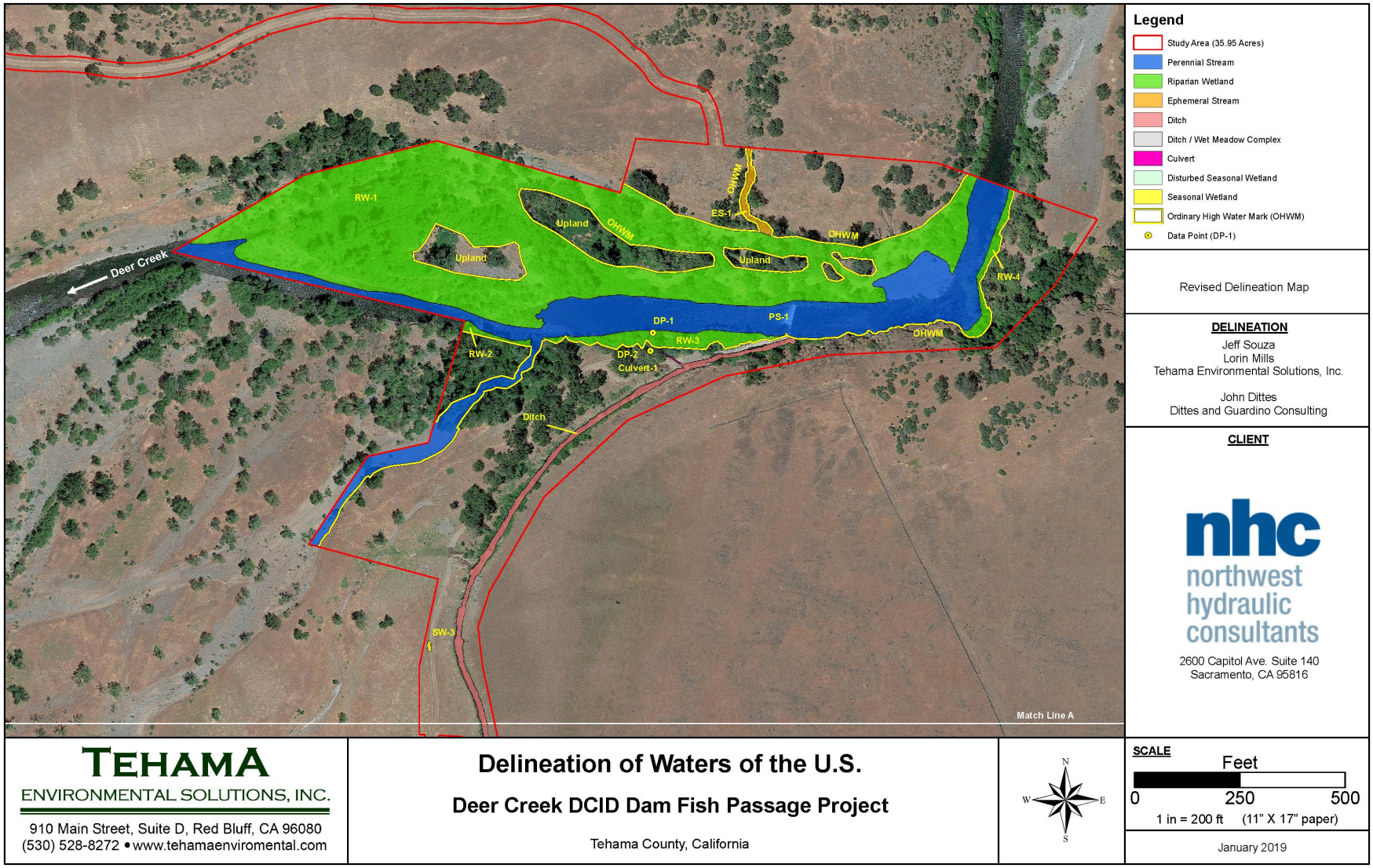


Figure 15. Delineation of the Waters of the U.S.

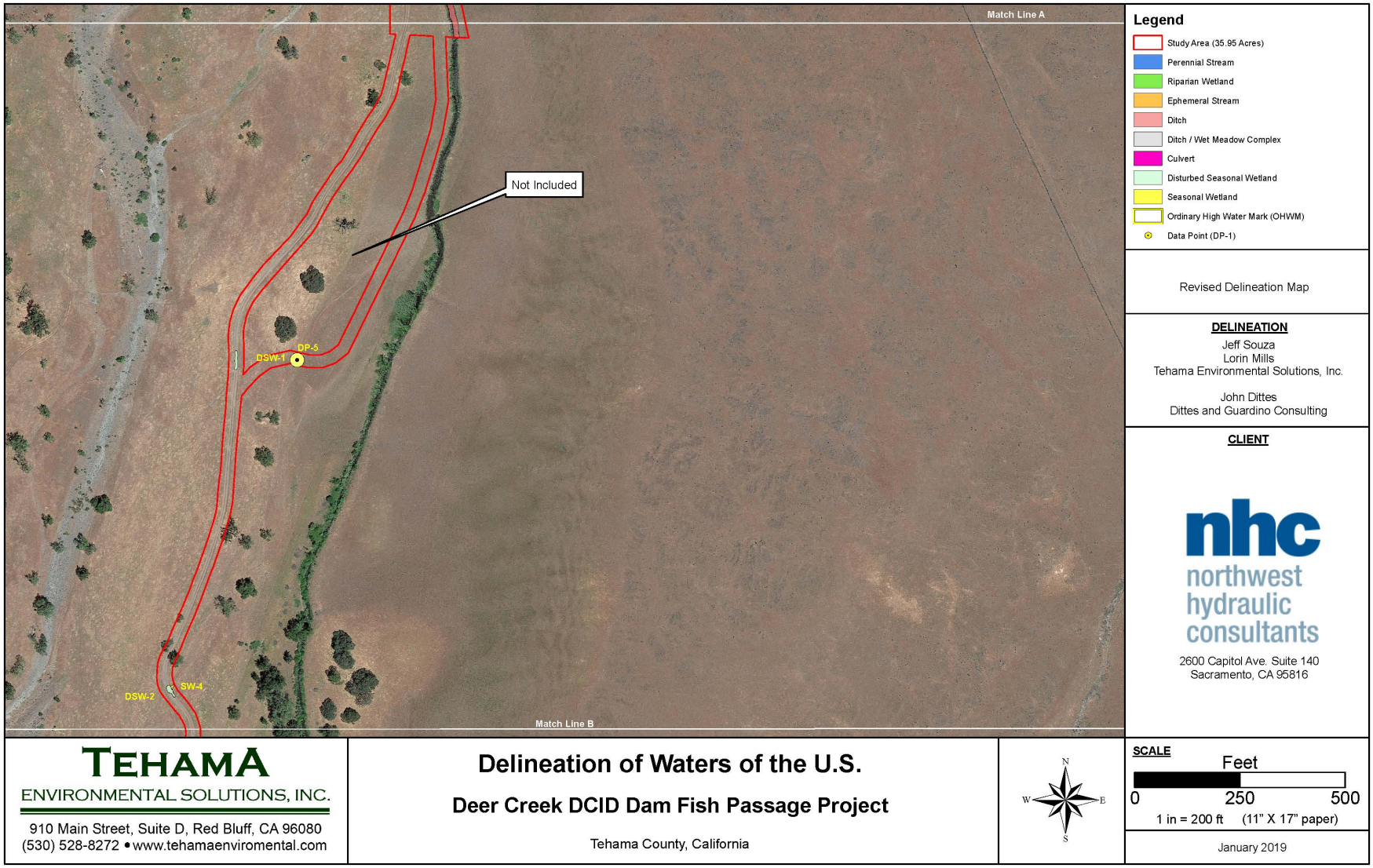


Figure 16. Delineation of Waters of the U.S.

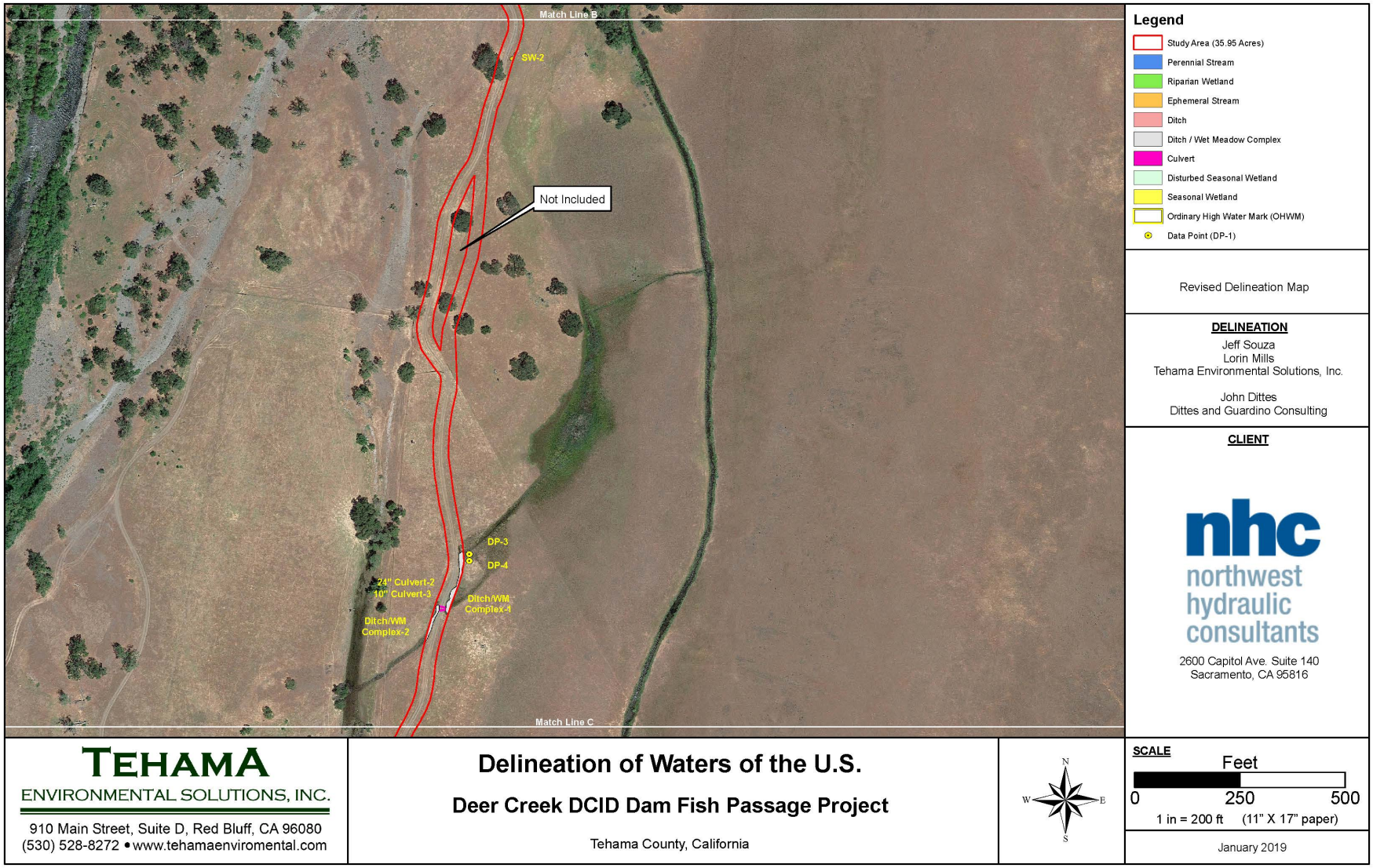


Figure 17. Delineation of Waters of the U.S.

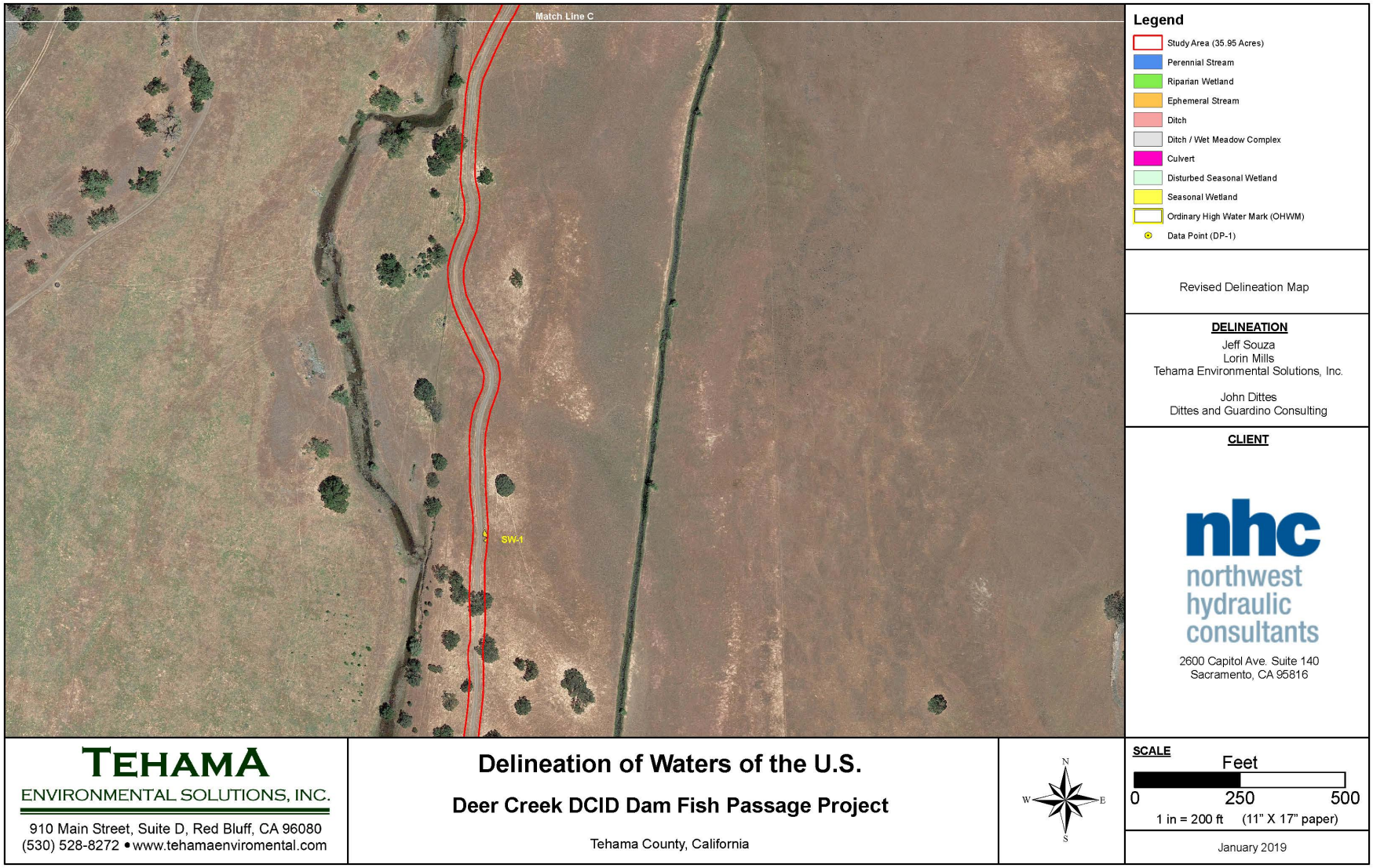


Figure 18. Delineation of Waters of the U.S.

3.4.10 Fisheries

3.4.11 Affected Environment

Deer Creek is an especially important watershed, as it is one of the few remaining spawning habitats for the Central Valley spring-run Chinook salmon (herein referred to as spring-run salmon or spring-run), which are federally and state listed as Threatened. Deer Creek has one of the highest potentials for spring-run Chinook salmon restoration within the Sacramento Valley (U.S. Fish and Wildlife Service 1999). Deer Creek has maintained much of the natural qualities of the watershed due to Deer Creek's current relatively undisturbed habitat, distance from large population centers, and absence of any major dams to obstruct fish passage (U.S. Fish and Wildlife Service 1999).

The project would contribute toward the implementation goals of several existing Central Valley fish and wildlife restoration plans to create a healthier, more natural functioning ecosystem; enhance and restore aquatic and riparian habitats; protect threatened and endangered species; and augment cumulative efforts to at least double populations of anadromous fish in Central Valley streams. The proposed project is consistent with recommendations for Deer Creek in the *AFRP Final Restoration Plan* (U.S. Fish and Wildlife Service 2001). The proposed project is also consistent with Senate Bill 1086, passed into law in 1986, to help reverse trends of declining salmon runs and loss of riparian habitat in the upper Sacramento River system. This action required development of a plan to establish priority actions for the upper Sacramento River and its tributaries between the Feather River and Keswick Dam. The project is also consistent with a number of other pertinent fisheries planning documents including the goals stated in *Restoring Central Valley Stream: A Plan for Action* (Reynolds et al. 1993), goals stated in the *Report to the Fish and Game Commission: A Status Review of the Spring-run Chinook Salmon (Oncorhynchus tshawytscha) in the Sacramento River Drainage* (California Department of Fish and Game 1998), and the goals and mission of the *CALFED Bay-Delta Program's Ecosystem Restoration Program Plan* (ERPP). The foundation of this program is restoration of ecological processes that are associated with stream flow, stream channels, watersheds, and floodplains.

The proposed project is located within the valley reach of Deer Creek, at the base of the foothill reach, approximately 11 stream miles upstream of the confluence with the Sacramento River. Water flows and temperatures vary significantly based on the amount and timing of fall, winter and spring rainfall, as well as irrigation / diversion timing.

Deer Creek supports runs of Central Valley spring-run Chinook salmon, listed as Threatened under both the federal Endangered Species Act (ESA) and the California Endangered Species Act (CESA). Deer Creek also supports resident rainbow trout and the anadromous form of steelhead which is listed as Threatened under the federal ESA. Deer Creek also supports populations of fall- / late fall-run Chinook salmon designated as a state Species of Special Concern by CDFW and winter-run Chinook salmon, state and federally designated as Endangered. Winter-run Chinook are not known to spawn in Deer Creek due to a lack of suitable habitat but may use Deer Creek for non-natal rearing (fish born elsewhere that emigrate to rear) in the lower reaches. However, they are not expected to be present in the project reach as they are not likely able to pass the Stanford Vina diversion dam, located downstream of the DCID diversion (M. Johnson pers. comm.).

Some other resident fish in Deer Creek include hardhead (*Mylopharodon conocephalus*), California roach (*Hesperoleucus symmetricus*), riffle sculpin (*Cottus gulosus*), speckled dace *(Rhinichthys osculus)*, tule perch *(Hysterocarpus traskii)*, Sacramento pikeminnow (*Ptychocheilus grandis*), and Sacramento sucker (*Catostomus occidentalis*) (U.S. Fish and Wildlife Service 1999).

Non-native fish species are also present in Deer Creek. Exotic species known to occur in Deer Creek include brown trout *(Salmo trutta)*, bluegill *(Lepomis macrochirus)*, green sunfish *(Lepomis cyanellus),* carp *(Cyprinus carpio)*, white catfish *(Ameiurus catus)*, smallmouth bass *(Micropterus dolomieu)* and largemouth bass *(Micropterus salmoides)* (The Habitat Restoration Group 1998).

A limited amount of fisheries data from Deer Creek have been collected since the early 1990s. Table 5 below provides a summary of the reported annual Deer Creek spring-run salmon escapement numbers (the portion of the population that reaches freshwater spawning grounds) into Deer Creek from 1994 to 2017.

Table 5. Central Valley Spring-run Chinook Escapement Numbers

Year	Spring-run Chinook	Year	Spring-run Chinook
1994	485	2006	2,432
1995	1,295	2007	644
1996	614	2008	140
1997	466	2009	213
1998	1,879	2010	262
1999	1,591	2011	271
2000	637	2012	734
2001	1,622	2013	708
2002	2,195	2014	830
2003	2,795	2015	268
2004	804	2016	331
2005	2,239	2017	219

(Source: Azat 2018)

Elevation variation has a significant effect on egg incubation timing in the watershed. As a result, depending upon the elevation at which an adult female spawned, spring-run Chinook fry from a given brood year may emerge over a six-month period or more, depending on water temperatures, beginning in October and potentially lasting until April (M. Johnson pers. comm. 2016). Once emerged from the gravel, fry may immediately begin migrating downstream or may remain in the stream from several months to more than a year (U.S. Forest Service 1999), therefore juvenile spring-run are expected to be rearing within the project area year-round (M. Johnson pers. comm. 2016). In Deer Creek, October 3 was the date at which the first "yearling" (individuals that have spent at least one summer in freshwater, typically in the upper watershed, before exiting the tributary in fall through spring of the following year) Chinook was detected at the Deer Creek rotary screw traps from 1994 through 2009 (Johnson and Merrick 2012). The Deer Creek rotary screw trap data set shows that yearling spring-run Chinook juveniles out-migrate from October through June, beginning with the first fall rains (M. Johnson pers. comm. 2016) and in greatest numbers from October through December continuing at lesser rates through the winter and spring (Johnson and Merrick 2012).

Table 6 below depicts the results of a rotary screw trap that was operated between October 1994 and June 2010 sampling a total of 89,526 juvenile Chinook salmon (Johnson and Merrick 2012). Individual chinook were classified as "yearlings" (stream type life history) or were classified as "young-of-the-year" (ocean type life history) (Johnson and Merrick 2012). Steelhead / rainbow trout were also sampled. Yearling Chinook out-migration was found to occur from October through June, with peak outmigration occurring from October to December (Johnson and Merrick 2012).

Table 6. Deer Creek Rotary Screw Trap Catch Summary for Years 1994-2010				
Month	**Days Fished Total**	**Yearling Chinook Total**	**Young of the Year Chinook Total**	**Steelhead / Trout Total**
October	182	297	0	44
November	347	1,892	3	323
December	345	1,249	675	212
January	284	343	13,478	145
February	183	111	17,486	30
March	251	202	31,668	132
April	276	126	13,543	151
May	241	10	8,333	113
June	98	0	140	19
Total	2,207	4,230	85,326	1,169

(Source: Modified from Johnson and Merrick 2012)

3.4.12 Environmental Consequences / Impacts and Mitigation Measures

Methodology

The assessment of potential impacts of the proposed project on fisheries is based on a review of databases and pertinent literature, consultation with resource agency staff, and field studies that are documented in a *Biological Resources Evaluation* (Tehama Environmental Solutions 2018) that was prepared for the proposed project. This document is available on the Red Bluff Fish and Wildlife Office website on the AFRP webpage (http://www.fws.gov/redbluff/afrp.html).

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

Based on the results of the CNDDB search, the USFWS and NMFS species lists and TES's additional knowledge of the site and local area, a list of potentially occurring special-status species and natural communities was developed for the project and is included as Appendix D. 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.

Field surveys and additional observations were made during work conducted at the project site for other purposes in 2018 and 2019 by TES staff. The study area included all aquatic sites within the project boundary. The surveys were conducted by walking the entire project site and recording fisheries observations. No

snorkel surveys, or other intensive fisheries surveys were conducted. A list of all fish species observed during field surveys is included in Appendix E.

An evaluation of the potential presence of special-status species is included in Appendix D. Based on the results of that evaluation, the Biological Resources Evaluation further evaluated the potential impacts of the proposed project on those species with the potential to occur within, or near the proposed project site. Based on that further evaluation, the following special-status fish species, designated CH and Essential Fish Habitat (EFH) are known to, likely to, or have the potential to occur within the project area, and could potentially be significantly impacted by the proposed project:

- Riffle Sculpin *(Cottus gulosus)*
- Pacific Lamprey *(Entosphenus tridentatus)*
- Hardhead *(Mylopharadon conocephalus)*
- Central Valley Steelhead *(Oncorhynchus mykiss)*
- Central Valley Fall- / Late Fall-run Chinook Salmon *(Oncorhynchus tshawytscha)*
- Central Valley Spring-run Chinook Salmon *(Oncorhynchus tshawytscha)*
- Central Valley Steelhead Critical Habitat
- Central Valley Spring-run Chinook Salmon Critical Habitat
- Pacific Salmon Essential Fish Habitat

Riffle Sculpin

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

Pacific Lamprey

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

are known to rear within the study area (M. Johnson pers. comm.). Pacific lamprey were observed within the study area during TES site surveys. In addition, CDFW observed Pacific lamprey spawning within the study area during foothill yellow-legged frog surveys in April and May of 2018(P. Bratcher pers. comm.).

Hardhead

The hardhead is a CDFW Species of Special Concern. This species inhabits undisturbed mid- to low- elevation streams that have clear, deep pools with sand, gravel and boulder substrates and low water velocities (Moyle et al. 2015). Threats to the species include loss of habitat from changes in stream flows and temperature regimes, elimination of habitat due to dams, and predation by non-native fish species (Moyle et al. 2015). In the Sacramento River system, they are widely distributed in most of the larger tributaries as well as the river. Adult and juvenile hardhead are known to occur within the study area (M. Johnson pers. comm.). Hardhead were not observed during site surveys, however intensive fish surveys were not conducted.

Central Valley Steelhead

The Central Valley steelhead Distinct Population Segment (DPS) was listed as Threatened by NMFS on May 18, 1998 and February 6, 2006. CH was designated by NMFS on September 2, 2005. EFH has not been designated by NMFS. Population declines are attributed to blockage from upstream habitats, entrainment from unscreened diversions, hatchery practices and degraded habitat conditions due to water development and land use practices. Steelhead are generally distributed from southern California to the Aleutian Islands. In the Central Valley, naturally producing populations occur in the Sacramento River and its tributaries. Steelhead stocks in the Central Valley are considered winter-run steelhead (McEwan and Jackson 1996). Central Valley steelhead adult migration occurs from October through February. Spawning occurs from December through April in streams with cool, year-round, well-oxygenated water. Incubation generally occurs from December through April. Emigration occurs in the spring and early summer as one-year-old fish. The study area is located in the currently designated CH for Central Valley steelhead. They are known to occur within the study area reach of Deer Creek and are also known to migrate through, and spawn upstream of the study area (M. Johnson pers. comm.). Juvenile steelhead are also known to use the study area reach of Deer Creek for rearing (M. Johnson pers. comm.). Rainbow trout / steelhead were observed during TES site surveys.

Central Valley Fall- / Late Fall-run Chinook Salmon

The Central Valley fall-run and late fall-run Chinook salmon are designated as a NMFS Species of Concern and as a CDFW Species of Special Concern. EFH was designated by NMFS on June 28, 2005. Population declines are attributed primarily to overfishing, unscreened diversions, and stream spawning and rearing habitat degradation. Central Valley fall-run Chinook salmon adult migration occurs in the Sacramento River from July through December. The peak of spawning occurs in October and November, incubation occurs from October through March, and rearing and emigration occurs from January through June. A majority of juvenile fish out-migrate within the first few months after emergence, but a small number remain in freshwater and out-migrate the following year. Central Valley late fall-run Chinook salmon overlap the fall-run spawning migration and enter the Sacramento River from mid-October through mid-April. Spawning occurs in the Sacramento River and tributaries from January through mid-April, incubation occurs from January through June, and rearing and emigration occurs from April through mid-December. The study area is located in the currently designated EFH for Central Valley fall- / late fall-run Chinook salmon. They are known to occur within the study area reach of Deer Creek and are also known to migrate through, and spawn upstream of the study area (M. Johnson pers. comm.). Juvenile fall- / late fall-run salmon are also known to use the study area reach of Deer Creek for rearing (M. Johnson pers. comm.). Central Valley fall- / late fall-run Chinook salmon were not observed during TES site surveys, however intensive fish surveys were not conducted.

Central Valley Spring-run Chinook Salmon

The Central Valley spring-run Chinook salmon was listed as Threatened by the State of California on February 5, 1999. NMFS listed the Central Valley spring-run Chinook salmon Evolutionary Significant Unit (ESU) as Threatened on September 16, 1999. CH was designated by NMFS on January 2, 2005. EFH was designated for Pacific salmon, which includes this ESU, by NMFS on June 28, 2005. Population declines are attributed primarily to altered stream flows and blocked access to upper elevation headwaters due to dams. Spring-run Chinook salmon are thought, by some, to once have been the most abundant run of salmon in the Central Valley. This race once migrated into the headwaters of tributaries to the Sacramento and San Joaquin Rivers. They now only exist in the mainstem and a few tributaries to the Sacramento River. Central Valley spring-run Chinook salmon adult migration occurs in the Sacramento River from late March to September. The fish oversummer in coldwater habitats and then spawn from August to October with peak spawning occurring in September. Incubation occurs from mid-August to mid-March with rearing and emigration occurring from mid-August through April. Deer Creek is one of the few tributaries to the Sacramento River where spring-run Chinook salmon reproduce. The project site is located in the currently designated CH and EFH for Central Valley spring-run Chinook salmon. They are known to occur within the study area reach of Deer Creek and are also known to migrate through, and spawn upstream of the study area (M. Johnson pers. comm.). Juvenile spring-run salmon are also known to use the study area reach of Deer Creek for rearing (M. Johnson pers. comm.). Spring-run salmon were not observed during TES site surveys, however intensive fish surveys were not conducted.

Central Valley Steelhead Critical Habitat

The stream reach in which the project is located is within the designated CH for Central Valley steelhead. CH for steelhead is defined as specific areas that contain PCEs and physical habitat elements essential to the conservation of the species. The inland habitat types present within the project area that are used as PCEs for steelhead include spawning habitat, freshwater habitat and freshwater migration corridors.

Central Valley Spring-run Chinook Salmon Critical Habitat

The stream reach in which the project is located is within the designated CH for Central Valley spring-run Chinook salmon. CH for spring-run salmon is defined as specific areas that contain PCEs and physical habitat elements essential to the conservation of the species. The inland habitat types present within the project area that are used as PCEs for spring-run salmon include spawning habitat, freshwater habitat and freshwater migration corridors.

Essential Fish Habitat

The proposed project is within the EFH of “Pacific Salmon”. EFH occurs within the project area for spring-run salmon and fall- and late fall-run salmon. EFH has not been designated for steelhead.

No Action Alternative

Under this alternative, all existing project components would remain unchanged, which would continue to impact the ability for anadromous fish and other native species to migrate upstream and out-migrate downstream of the DCID diversion. Under this alternative, potential injury or mortality would not occur to anadromous fish as a result of the construction activities. Beneficial impacts to Deer Creek fish populations from improved passage to upstream areas that have favorable habitat would not occur. Improved passage for juvenile fish emigration would not occur. No modifications would occur to Central Valley steelhead CH or Central Valley spring-run Chinook salmon CH. Beneficial effects to Central Valley steelhead CH and Central Valley spring-run Chinook salmon CH as a result of improved passage would not occur. No modifications would occur to EFH. Beneficial effects to EFH as result of improved passage would not occur.

Proposed Action Alternative

Under this alternative, activities from the proposed project would potentially cause significant impacts to the following species and designated CH and EFH. Project activities that could cause significant impacts include site dewatering and rewatering activities, fish rescue operations, instream construction, water quality issues and vegetation removal.

Riffle Sculpin

Under this alternative, riffle sculpin could be harmed or killed by construction activities if they were present within the project area. This is considered a potentially significant impact. Beneficial effects to this species would occur as a result of improved upstream and downstream passage conditions for native adult and juvenile fish, including riffle sculpin.

Pacific Lamprey

Under this alternative, Pacific lamprey could be harmed or killed by construction activities if they were present within the project area. This is considered a potentially significant impact. Beneficial effects to this species would occur as a result of improved upstream and downstream passage conditions for native adult and juvenile fish, including Pacific lamprey.

Hardhead

Under this alternative, hardhead could be harmed or killed by construction activities if they were present within the project area. This is considered a potentially significant impact. Beneficial effects to this species would occur as a result of improved upstream and downstream passage conditions for native adult and juvenile fish, including hardhead.

Central Valley Steelhead

Under this alternative, potential direct effects to adult or juvenile steelhead would include construction activities related to the dewatering of the Deer Creek channel, construction of the roughened channel, rewatering of the Deer Creek channel and retrofitting of the fish screen and bypass pipe due to:

- construction activities,
- delays in migration, emigration or avoidance of habitat due to project activities, and
- fish rescue operations.

The start of instream construction is scheduled to occur during the low-flow period when stream temperatures are increased and adult anadromous salmonid migration through the area is not expected to occur. During post-instream construction (October 1), adult salmonids may be migrating through, and spawning in the area. Emigrating juveniles are less likely to be in the project area during the instream construction period by could potentially be in the project area during the entire project period. Fish that may potentially be migrating or emigrating through the project reach would be able to pass through the project by using the dewatering channel. Any potential delays would be short-term due to the fact that construction would only occur for eight to ten hours per day, which would allow fish to migrate and emigrate during daily non-construction periods. Juvenile fish that may be emigrating through the project areas, given the time of year, would be larger and more apt and able to avoid the areas, given their mobility.

A fish exclusion zone upstream and downstream of the construction areas, as needed, would be implemented prior to the onset of any instream construction activities. The actions necessary to remove fish out of the construction area are expected to result in some form of fish capture and handling. A permitted crew would be responsible for the seining, dip-netting, and / or electroshocking. Actions would be taken first to encourage fish to volitionally move out of the area prior to implementing other methods. If electrofishing is required, NMFS electrofishing guidelines (National Marine Fisheries Service 2000) would be used. Any capture and handling associated with electrofishing is likely to result in direct effects to juvenile steelhead rearing in the fish exclusion zones. It is expected that capture, handling and release of the juvenile steelhead

would disrupt normal behavior and cause temporary stress, injury, and potentially mortality. It is anticipated that fish capture / relocation would not last more than two to three days for dewatering and another two to three days for rewatering, however additional capture / relocation would occur if additional fish are observed within the exclusion zone as a result of daily monitoring. The fish exclusion zones would be maintained until the construction is completed and instream turbidity has dissipated.

An area upstream of the DCID diversion, and downstream of the temporary dewatering diversion dam would likely have juvenile, and potentially adult fish present through the summer. These fish would not be able to move upstream or downstream during the instream construction period but would be supported by approximately 36 cfs of water flowing through the reach to be diverted at the DCID dam to meet DCID's irrigation needs. This area would be monitored to ensure that temperatures and dissolved oxygen level were adequate to keep the fish in good condition. If monitoring indicated that the fish were as risk, a fish rescue of this reach would be implemented.

During rewatering, a plume of turbidity would be anticipated immediately following construction activities as the channel immediately begins to adjust to the new conditions. This turbidity and small amount of suspended sediment would likely persist in the water column for several hours until channel conditions stabilize, however rewatering activities would occur slowly, in order to prevent and minimize turbid conditions in Deer Creek. Turbidity and settleable matter are not expected to exceed the likely conditions in the Clean Water Act Section 401 Certification issued by the RWQCB. If juvenile steelhead are present in the immediate areas of construction, it is believed that the number of fish affected would be few and most would volitionally leave the areas until activities cease or turbidity diminishes. Juvenile fish should be able to escape to available refugia near the areas, a non-lethal behavioral response.

During the initial time period following construction and the initial winter, a small amount of sediment that would be disturbed by project construction activities would likely be redistributed by high flows. Because the anticipated amount of sediment is very small, and mobilization would occur slowly post-construction and during high flows of the initial winter (when background turbidity and sediment transport is relatively high), only minimal affects to adult or juvenile steelhead are anticipated.

As a result of the roughened channel construction, construction of the temporary bypass channel and relocation of the bypass pipe, some of the wetland riparian habitat along the stream banks would be temporarily disturbed. It is estimated that approximately three acres of riparian wetland may be temporarily and permanently disturbed as a result of the construction related project activities. A portion of this area along the roughened channel would result in a temporary reduction of shaded aquatic habitat.

Impacts could occur if steelhead were present within the project area and were harmed or killed by project construction activities. This is considered a potentially significant impact. Beneficial effects to this species would occur as a result of improved upstream and downstream passage conditions for native adult and juvenile fish, including Central Valley steelhead.

Central Valley Fall- / Late Fall-run Chinook Salmon

Under this alternative, the impacts to fall- / late fall-run salmon are expected to be similar to the impacts listed for steelhead. This is considered a potentially significant impact. Beneficial effects to this species would occur as a result of improved upstream and downstream passage conditions for native adult and juvenile fish, including Central Valley fall- late fall-run Chinook salmon.

Central Valley Spring-run Chinook Salmon

Under this alternative, the impacts to spring-run salmon are expected to be similar to the impacts listed for steelhead. This is considered a potentially significant impact. Beneficial effects to this species would occur as a result of improved upstream and downstream passage conditions for native adult and juvenile fish, including Central Valley spring-run Chinook salmon.

Central Valley Steelhead Critical Habitat

Under this alternative, while there would be changes to the habitat that currently exists within the project sites as a result of construction of the roughened channel, no net loss of CH would be expected as a result of project implementation. Turbidity generated by construction activities could have an effect on the CH elements that address water quality, however the impact to this element is considered very minimal because 1) the impact is considered very small in quantity; and 2) the project would improve access for fish to upstream habitats. As a result of some streamside vegetation removal, there would be a reduction of shaded aquatic habitat. To minimize this effect, vegetation would be replanted as detailed in the RPMs outlined in Appendix F, and the revegetation plan to be prepared for this project. Given the temporary nature of project construction, the risk of short-term impacts is relatively low, compared to the long-term benefits of improved fish passage that the proposed project would provide. This is considered a less than significant impact. Beneficial impacts would occur by enhancing all three PCEs including spawning habitat, freshwater rearing habitat and freshwater migration corridors. An Endangered Species Act consultation will occur with NMFS to address potential impacts to Central Valley Steelhead CH.

Central Valley Spring-run Chinook Salmon Critical Habitat

Under this alternative, the impacts to Central Valley spring-run Chinook salmon CH are expected to be similar to the impacts described above for Central Valley steelhead CH, including beneficial impacts. This is considered a less than significant impact.

Essential Fish Habitat

Under this alternative, no net loss of EFH is expected as a result of project implementation. The effects would be expected to be similar to the effects described under the Central Valley Steelhead CH section above, including beneficial impacts. This is considered a less than significant impact.

The following measures would be implemented to avoid and minimize impacts to fisheries and to mitigate potentially significant impacts to fisheries to less than significant levels:

FISH-1: Instream work can occur between July 1st and September 30th. Instream work could start sooner if the California Department of Fish and Wildlife (CDFW) determines that the adult CV spring-run Chinook salmon are no longer present based on environmental conditions and real time passage data. Instream work could be extended October 14th, if environmental conditions which would preclude juvenile steelhead and spring-run Chinook salmon emigration or adult steelhead and late-fall-run Chinook salmon immigration are expected to persist. Instream work outside of the July 1st to September 30th work window must be approved by CDFW and the National Marine Fisheries Service (NMFS) on a case-by-case basis with details on how take will be avoided and / or minimized.

FISH-2: All construction debris (concrete, metal, etc.) from the fish passage improvement-related construction activities shall be removed from the active stream channel post-construction.

FISH-3: Immediately prior to installation of temporary dam structures, a qualified fish biologist, in coordination with CDFW, will conduct snorkel surveys above and below the dam and diversion, to identify presence of salmonids. The U.S. Fish and Wildlife Service (USFWS), in coordination with the contractor, and in consultation with NMFS and CDFW, will ensure that qualified fish biologists are onsite to implement fish rescue operations within the dewatered area through the use of herding, seining and / or electrofishing, if necessary. Best professional determination will be used to decide which method(s) of rescue is to be used and where the relocation of captured fish, either upstream or downstream of the temporary dams is to occur. Biologists will first try to haze and herd fish out of the fish exclusion area. If fish biologists determine that the use of electrofishing is necessary for the efficient and successful removal of fish, NMFS electrofishing guidelines (National Marine Fisheries Service 2000) will be strictly followed. The fish rescue team will be comprised of fishery biologists with professional experience using

seines and electrofishing equipment. The same methodologies will be used during dewatering of the diversion ditch.

FISH-4: For the duration of the project, all diverted water must be screened through the existing screens, which currently do not meet CDFW and NMFS criteria, however best professional judgement will be used to prevent harm to juvenile fish through frequent monitoring and site specific modifications as needed. Furthermore, all water returned to the stream will comply with NMFS bypass return criteria, including consideration of the location of the bypass pipe exit (i.e. bypassed water will enter the watercourse and will not be of an excessive height, or empty onto rocks, etc.) for the duration of the bypass period.

FISH-5: All Reasonable and Prudent Measures and Terms and Conditions found in the Programmatic Biological Opinion issued by NMFS for the project (National Marine Fisheries Service 2016) will be adhered to.

FISH-6: All dewatering and re-watering activities will be conducted slowly, in order to minimize disturbance to fish. A qualified fisheries biologist will be onsite during these activities, and CDFW will be notified prior to these activities.

FISH-7: All water pumps used during construction shall be screened to meet CDFW and NMFS criteria, unless deemed unnecessary by CDFW and NMFS (i.e. if water was being diverted from an off-channel pool). The refueling of pumps will occur away from the wetted area / channel. If pumps are using fuel, they will be outfitted with a spill kit.

FISH-8: Adequate erosion and pollution control measures shall be taken to ensure that sediment, turbidity, petroleum products or other harmful chemicals do not enter Deer Creek as a result of construction activities. Standard Best Management Practices (BMPs) shall be incorporated into the project designs.

FISH-9: BMPs will be developed and implemented to ensure that wet concrete does not enter Deer Creek, wetlands or other aquatic sites during construction.

FISH-10: All reasonable measures will be taken to minimize impacts to lamprey, including spending more time at the area as it becomes dewatered (and they are moving out of the mud, chasing the water as it recedes), and possibly electroshocking.

FISH-11: Appropriate measures will be used to avoid the spread of aquatic invasive species such as zebra / quagga mussels, New Zealand mudsnails and chytrid fungus to and from the project area according to the current CDFW Aquatic Invasive Species Disinfection / Decontamination Protocols (Northern Region) and the current USFWS Red Bluff Fish and Wildlife Office Anadromous Fish Restoration Program Hazard Analysis Critical Control Point Plan.

3.5 Cultural and Tribal Cultural Resources

3.5.1 Affected Environment

Five archaeological sites are located within the project area. These include the DCID diversion dam / ditch and four prehistoric Native American sites.

<u>DCID Diversion Dam and Ditch</u>

In its current condition, the DCID Diversion Dam is a mix of original 1928 constructed features along with later demolitions, replacements, and augmentations of generally undetermined vintage. The DCID Diversion Dam is a vertical buttress dam built by cast-in-place, reinforced concrete construction. As defined here, the dam is composed of four main components, each built in 1927, the main headwall and weir, the north bulkhead, the

south bulkhead, and the main headgate wing. The DCID ditch was originally constructed in 1928 with modifications up to 1933. The ditch is composed of a diversion box, ditch headgate and ditch headbox.

Prehistoric Native American Sites

The Project Area is contained within traditional Southern Yana, or *Yahi* territory. Four prehistoric Native America sites were discovered and are identified as: DCID South #1, DCID South #2, DCID South #3 and DCID North #1.

DCID South #1

DCID South #1 is a prehistoric Native American midden-mound site. A hummocky midden follows the crest of the landform, and the hummocks are probably former housepit berms now muted by cattle activity. The midden is a coarse-textured, dark yellow-brown sandy clay and contains a high density of metavolcanic flakes, core tools, spall tools, and fire-cracked rock. Intensive surface reconnaissance encountered 56 artifacts. The artifacts included 27 basalt flakes, 12 metavolcanic flakes, seven metavolcanic core tools, two obsidian projectile point fragments, one metavolcanic spall tool, one basalt core tool, one basalt spall tool, one basalt flake tool, one basalt groundstone fragment, and one basalt hopper mortar. The projectile points both appear to have been made from local Tuscan source obsidian. Both were non-diagnostic margin shatter, although both were robust dart point fragments, not gracile arrow point fragments, indicating that the site is at least in part Archaic in age.

A minimum of 15 possible housepits were observed, generally better-resolved toward the north end of the site. One large, irregular, oval-shaped depression near the west-center of the site is probably a large roundhouse pit.

A large, prominent, rounded boulder measuring 480 (E-W)-x-320 (N-S) centimeters and 120 centimeters above the ground surface at the peak was identified in the channel swale. The boulder is so large and smoothed by water wear that it must have been emplaced here on the Tertiary fan landform by Plio-Pleistocene-aged debris flow and re-exposed by later channel erosion. The top of the boulder is flat providing a 3.5-x-1.5 meters surface area covered with 18 modifications. There are three large bedrock milling basins (n=3; 40.0–90.0 cm long, 24.0–47 cm wide, 6.0–18.0 cm deep). All three are cupped around the margins and slightly depressed in the center, like a serving tray. All three have a smooth basin exhibiting some striations with lengthwise orientation and some pecking smoothed over by polish. All three appear old and weathered. Based on the pattern of superposition, the basins appear to have been the oldest feature. There are also 14 cup-shaped depressions. They range in size between 4.0 and 30.0 centimeters in maximum diameter, in three size / function groups: cupules (n=7; 4.0–6.0 cm diameter, 0.5–1.5 cm deep); shallow mortars (n=3; 10.0–14.0 cm diameter, 1.0–2.5 cm deep), and deep mortars (n=5; 22.0–30.0 cm diameter, 8.0–17.0 cm deep).

The cupules are all shallow cup-shapes and no pecking is evident, suggesting all were manufactured by grinding. The shallow mortars show some pecking remnants overridden by grinding polish. The large mortars exhibit grinding only and in the case of the largest. The area around the rim is polished to a high gleam. All five of the deep mortars exhibit a distinctive “two-tiered” morphology. The top tier of the mortar is broad and perfectly round in profile and cross-section, indicating grinding of this first tier resulted in a deep bowl, like the impression of a large ball. For all five, in the center of the deep bowl a narrow, conical second tier mortar has been ground.

With respect to the relative age of the features, there are some clear clues. First, the milling basins appear older and more weathered. Second, there is no superposition of cupules and mortars, but both cupules and mortars are inset into milling basins, indicating the cupules and mortars are the same approximate age and the milling basins are older than both. Third, extensive wear polish around the rims of the deep mortars replaces the milling basin wear but grinding evident in the basins does not replace mortar rim wear. Finally, the two-tiered mortars were clearly used in two phases, but it cannot be determined here if the two tiers

were serial or concurrent, that is, if an existing set of bowl mortars were further deepened by conical grinding at a later date, or if mortars used concurrently were adapted to conical use each time they achieved a certain depth or volume. The coloration of the tiers is different but this appears to be a product of the differential accumulation of carbonate and humate precipitates related to the capture of meteoric water in the bowl, and not to differential weathering related to age. Examination of the stratigraphic sequence of pestles in the adjoining midden could produce an answer.

Human remains were not observed on the surface, but subsurface human remains are highly likely based on comparison to similar midden mound sites in similar environmental settings previously excavated in the region (White 2003).

DCID South #2

DCID South #2 is a prehistoric Native American midden-mound site. The site measures 127 meters north-south by 45.0 meters east-west. Perennial Deer Creek is now west of the west boundary of the site; however, the site resides alongside an extinct distributary channel scar, and this channel probably carried Deer Creek waters around the time of occupation.

A hummocky midden follows the bluff edge. The midden is dark red-brown containing a high density of metavolcanic flakes, core tools, spall tools, and fire-cracked rock. The mound rises up to 1.8 meters above the surrounding bench terrain.

Fifteen artifacts were observed and digitized. The artifacts included, five metavolcanic core tools, four basalt flake, three metavolcanic flakes, one basalt spall tool, one basalt core tool, and one obsidian projectile point fragment. The projectile point appeared to have been made from local Tuscan source obsidian and was a non-diagnostic margin fragment.

Ten definitive housepit features were observed in two clusters, a north cluster composed of seven housepits and a south cluster composed of three. In both clusters, the houses are so closely spaced that it is likely the walls touched. Doorway depressions are visible for five of the seven north cluster housepits, and rather than a specific alignment, the doorways tended to point out from the center of the cluster, probably necessitated by the tight packing. Between the two clusters there are additional hummocks probably representing former housepit berms now muted by cattle activity.

The bluff bank at the site is very steep (1:1.5 slope), and very tough and resistant to weathering so it is notable that there are four well-defined trails on the bluff adjoining the midden. All four trails emerge from housepit clusters and traverse the bluff at roughly 18- to 20-percent slopes; one actually has a switchback. The relaxed angle and use of the switchback are consistent with human activity, and it is likely that these trails are features originally associated with the prehistoric occupation, albeit used more recently by cattle.

Human remains were not observed on the surface but subsurface human remains are highly likely based on comparison to similar midden mound sites in similar environmental settings previously excavated in the region (White 2003).

DCID South #3

DCID South #3 is a prehistoric Native American lithic scatter site. The site measures 118 meters north-south by 65.0 meters east-west. The site resides alongside an extinct distributary channel scar, and this channel probably carried Deer Creek waters around the time of occupation. The channel now carries runoff through winter and ponded water through late spring.

The site was marked by a low- to moderate-density scatter of metavolcanic flakes. At the time of the survey, the site was overgrown with dense grasses, primarily wild oats and wild rye. The site had not been recently grazed, making surface visibility nil for most of the site except a small bare area associated with a cattle salt block patch. The site was identified and mapped based on surface scrapes with a hoe and trowel. The scrapes

were spaced every 10–25 meters, and all of the scrapes done within the boundary mapped here contained at least one flake. A total of 15 flakes was identified, but a larger inventory of flakes and a more diverse inventory of artifacts is likely present.

No human remains were observed and they are not likely to be present based on comparison to similar lithic scatter sites in similar environmental settings previously excavated in the region (White 2003).

DCID North #1

DCID North #1 is a large prehistoric Native American midden-mound. The site is composed of two midden loci (east and west) separated by a small ravine. The east locus was intensively occupied. It measures 132 meters east-west by 43 meters north-south, and is characterized by very dark midden forming a distinct mound at least 2.0 meters above the surrounding terrain. The midden is marked by a high-density of metavolcanic flakes and fire-cracked rock, with core tools and groundstone artifacts. The east socus has 23 large, well-defined housepits in two clusters and two well-defined roundhouse pits located within with the larger of the two housepit clusters.

The west locus was ephemerally or briefly occupied and may represent a contact-era "resettlement hamlet." It measures 88 meters east-west by 25 meters north-south and has a poorly developed midden with a low density of dispersed chipped stone flakes and fire-cracked rock. The west locus contains four small, shallow housepits and one large, irregular, oval-shaped depression which probably represents a roundhouse pit. The site corresponds to a U.C. Archaeological Survey placemark probably dating to the 1930s and more recently assigned the trinomial Ca-Teh-804, but unconfirmed until our visit.

The east locus is characterized by a high-density scatter of metavolcanic flakes and fire-cracked rocks. Several core tools and spall tools were also observed but not digitized. One highly polished bifacial handstone was identified in the space between HP2 and HP3. The west locus was characterized by a low-density scatter of metavolcanic flakes and fire-cracked rock.

Twenty-seven housepits were observed and recorded, 23 in the east locus and four in the west locus. The east locus housepits were well-defined and several had possible doorway features but these could not be differentiated from other breaks in the perimeter berm potentially produced by rodent disturbance or cattle scuffing. The east locus housepits form two clusters: (1) a cluster of 17 located on the west end of the locus at the center of the site, and; (2) a cluster of six located on the east end, closer to the sharp bend in Deer Creek as it emerges from the canyon. All 23 of the east locus housepits are symmetrical, round, and unusually large for the region, ranging between 4.0 and 8.0 meters in maximum diameter and averaging 5.6-x-6.0 meters and 0.82 meters deep. One is 10-x-11 meters with a pit 1.8 meters deep. This may have been a sweat lodge, and its position on the bank immediately above Deer Creek is consistent with this interpretation. The west cluster housepits form a distinct arc around the two roundhouse pits, an arrangement frequently illustrated in ethnographic site maps from the region (White, G.G. and J. Reifschneider-Smith. 2018.). The west locus had four ephemeral housepits, all symmetrical and round but smaller, averaging just 3.0-x-3.0 meters and 0.38 meters deep, more on par with the size of mountain houses found in upper Deer Creek canyon (Johnson 1992).

The east locus also had two large, shallow, oval depressions here interpreted as roundhouses. They are both located near the footslope in the "back" of the settlement farthest from Deer Creek and both are surrounded by a dense arc of housepits. One of the roundhouses appears to be more recent than the other. It is well-defined with distinct berms. The other roundhouse appears to be older; it is poorly defined with weathered, flattened berms and pit fill. The east locus had one large, shallow, oval depression located on the west end of the west locus which may have been a roundhouse pit, measuring 8.0-x-8.0 meters and 0.7 meters deep.

3.5.2 Environmental Consequences / Impacts and Mitigation Measures

Methodology

The assessment of potential impacts of the proposed project on cultural resources is based on a review of databases and pertinent literature and field studies that are documented in a *Historical Resource Investigation* (White and Reifschneider-Smith 2018) that was prepared for the proposed project. A document review was conducted at the Northeast Information Center of the California Historical Resources Information System, California State University, Chico. In addition to consulting a number of primary and secondary archaeological sources, a field survey took place on five days, April 19–21 2018 and May 3–4, 2018 by Dr. Gregory White of Sub Terra Consulting, Archaeology and Paleontology (Sub Terra). The entire Area of Potential Effect was covered. When archaeological materials were identified coverage was expanded to define resource boundaries. All survey followed an intensive survey strategy consisting of pedestrian transects spaced between three and six meters apart (10–20 feet). The project area was open and grassy but generally freshly grazed, along with barren dirt roads resulting in high surface visibility. Where dense grass or leafy debris prevented ready visibility survey was augmented by surface scrapes using a trowel and hoe. GPS data-logging was accomplished using a high-resolution SX Blue II HEC© series Global Positioning System receiver linked via Bluetooth© to a Samsung S3 Tablet© running the Mapit© app for Android©. Photo-documentation was accomplished using the S3 digital camera, and georeferenced using the Mapit© app. Resources were recorded using California Department of Parks and Recreation site record forms (Cal DPR-523a-l) according to standards described in "*Instructions for Recording Historical Resources*" (California Office of Historic Preservation 1993).

Native American Coordination

Work reported here was carried out in conformance with 54 U.S.C. Section 302706, which requires federal agencies and entities operating under federal permits or funding, in carrying out their responsibilities of the National Historic Preservation Act (NHPA) Section 106, to consult with any Indian tribe that attaches religious and cultural significance to historic properties that may be affected by an undertaking. In order to establish a context for field investigation of the project area, primary and secondary Northern Yana ethnographic resources were consulted. In order to address this mandate, Sub Terra contacted the State of California, Native American Heritage Commission (NAHC) to request a Sacred Lands Inventory for the proposed project area. NAHC responded to the Sacred Lands Inventory request on June 4, 2018, indicating that NAHC files contain no listing for sacred lands in the vicinity of the proposed project. The NAHC response also included a list of six additional recommended tribal contacts. Letters containing a project description and map location were sent to the six on June 16, 2018. No response has been received as of the preparation of this document.

The project would have a significant impact if it would:

a. Cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5;

b. Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5;

c. Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature;

d. Disturb any human remains, including those interred outside of formal cemeteries; or

e. Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:

    i. Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k), or

ii. A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.

No Action Alternative

Under this alternative, no impacts or changes would occur to existing cultural or tribal resources that were identified and evaluated in the project area. The identified cultural resources, including the DCID irritation dam and ditch would remain unchanged. Disturbance to cultural resources located within the north and south access roads would continue at present levels.

Proposed Action Alternative

DCID Diversion Dam and Ditch

Under this alternative, the DCID diversion system would be modified to improve fish passage conditions. Under Section 106 of the NHPA, an historic resource may be determined eligible for the National Register of Historic Places if it possesses "integrity of location, design, setting, materials, workmanship, feeling, and association". The DCID diversion dam and ditch headworks represent cultural resources that lack integrity and therefore they do not qualify for the National Register of Historic Places. The proposed project to modify the dam and ditch headworks will have a "No Historic Properties Affected" outcome pursuant to 36 Code of Federal Regulations (CFR) Part 800.4(d)1. As such, there would be no substantial adverse change in a significant historical or archaeological resource or destruction of any unique paleontological resource. Any impacts to both the diversion dam and ditch would be less than significant.

Prehistoric Native America Sites

Under this alternative, the north and south access roads would be used to transport equipment, materials and personnel to and from the DCID construction site. The four prehistoric Native America sites are either adjacent to, or located within the north or south access roads. All four of these sites are considered significant and could potentially qualify for the National Register of Historic Places. These sites are currently subjected to disturbance due to ranching operations, DCID maintenance operations and fish screen maintenance operations. Project activities would increase the level of disturbance over and above the baseline conditions and could potentially alter directly or indirectly, characteristics qualifying the property for inclusion in, or eligibility for, the National Register of Historic Places. This could potentially result in an adverse effect pursuant to 36 CFR Part 800.4(d)1. This is considered a potentially significant impact.

The following measures will be implemented in order to avoid and minimize impacts and to mitigate potentially significant impacts listed above to cultural and tribal cultural resources to less than significant levels.

CULTURAL-1: The 400 foot section of access road passing within 100 feet of DCID Site #3 shall be considered environmentally sensitive and any use or modification of the access road in this area (e.g., placement of fill materials) shall be confined to the approximate footprint of the existing roadbed.

CULTURAL-2: Prior to the onset of construction, two new permanent DCID south access by-pass routes shall be constructed and used for all project activities to completely avoid impacts to DCID Site # 1 and DCID Site #2.

CULTURAL-3: At DCID North #1, where avoidance is not feasible, composite environmental matting shall be in place for the duration of Project construction in accordance with the methods outlined in White and Reifschneider-Smith (2018). The composite matting shall be composed of a basal layer of landscaping fabric, capped by a minimum 4 inch thick bed of wood chips, in turn capped by environmental matting. The composite matting shall cover any portion of impacted archaeological deposits and a 10 foot buffer

on all sides. The integrity of the matting shall be checked on a daily basis and maintained as necessary to protect the site for the duration of Project construction.

Equipment and vehicle traffic shall be confined to the matting in the vicinity of DCID North #1.

Prior to installation of the basal fabric, boulders scraped onto the site surface during the original DCID North Access construction shall be hand removed and the tree used as a fence corner-post at the south edge of the Locus shall be flush cut.

CULTURAL-4: In the event subsurface archaeological resources are encountered during ground-disturbing activities, all work will cease at the general area of discovery and the USFWS regional archaeologist, or other lead agency archaeologist, will be notified immediately. A field exam by a professional archaeologist may be required and further steps for resource protection will be implemented, including mitigation and consultation with the Native American Indian community if human remains are encountered (following Native American Graves Protection and Repatriation Act procedures). Work may proceed on other parts of the project site while mitigation for historical, unique archaeological or tribal resources is being carried out.

3.6 Environmental Justice

3.6.1 Affected Environment

On February 11, 1994, President Clinton issued Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority and Low-Income Populations." Environmental justice refers to "nondiscrimination in federal programs substantially affecting human health and the environment" and "providing minority communities and low income communities access to public information on, and an opportunity for public participation in, matters relating to human health or the environment". In particular, it involves preventing minority and low-income communities from being subjected to disproportionately high and adverse environmental effects of federal actions. In complying with NEPA, federal agencies are required to consider human health, economic, and social impacts of the proposed project on minority and low-income communities.

In 2013, the majority (90.9 percent) of Tehama County's population was Caucasian (U.S. Census Bureau 2015). Minorities of African American, Asian, Hawaiian or Pacific Islander, and Hispanic ethnicity comprises the remaining 9.1 percent of the county's population. Per capita personal income for Tehama County was $20,439, below the state average of $29,527. Tehama County had an unemployment rate (not seasonally adjusted) of 6.0 percent in June 2018 (U.S. Department of Labor 2018). There are no residences within approximately one mile of the DCID project site.

3.6.2 Environmental Consequences / Impacts and Mitigation Measures

Because environmental justice is not a CEQA issue, specific significance criteria were not applied in evaluating potential environmental justice consequences. Instead, any modification or change in environmental justice factors that would occur in response to the proposed action is evaluated in accordance with NEPA requirements. Incorporation of environmental justice principles throughout the planning and decision-making processes implements the principles of NEPA, Title VI of the Civil Rights Act, and the Uniform Relocation Act.

No Action Alternative

Under this alternative, no direct impact to a minority or low-income population or community would take place because the project would not be implemented. Therefore, there would be no impact.

Proposed Action Alternative

Under this alternative, the proposed project would improve fish passage at the DCID diversion dam and continue to meet the DCID water needs. Minority and low-income residents live in the county where the project is located, however there is no evidence to suggest that the project would cause a disproportionately high adverse human health or environmental effect on minority and low-income populations compared to other residents of the area. The known health risks that could be associated with the project are evaluated in the sections of this document related to water quality, air quality, hazardous materials, transportation and noise. For the most part, these health risks are associated with the construction aspects of the project, but there are no residents near the project that could be exposed to hazardous materials that may be associated with the project. The project would be managed through RPMs to minimize these risks, and also as required by applicable federal and state safety regulations. The proposed project's potential effects on environmental justice would be negligible, because it would have no significant unmitigatable impacts, and would be a relatively small, short-term project with no negative effect on any minority or low-income population.

3.7 Greenhouse Gas Emissions

3.7.1 Affected Environment

Along with natural causes, increases in GHG emissions occur through burning coal, natural gas, oil, and gasoline. The California Air Resources Board is the state agency responsible for monitoring and regulating sources of GHG emissions. GHG emissions may include carbon dioxide (CO_2), methane (CH4), nitrous oxide (N2O), hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride.

Regional sources of GHG emissions in the project area vicinity include traffic along State Route (SR) 99 East, Rock Quarry Road, Reed Orchard Road and other local roadways; electricity generation; and stationary sources from various commercial and industrial properties. Within the project area, the types of construction equipment that will be used and the calculated CO_2 equivalencies are shown in Appendix H. It is estimated that DCID construction activities would generate an estimated 790 metric tons of CO_2 equivalencies over the construction period.

3.7.2 Environmental Consequences / Impacts and Mitigation Measures

Methodology

GHG Inventory worksheets were used to estimate CO_2 equivalencies based on construction equipment and estimated operation days required for the proposed project. The data were used to analyze the impacts, context and intensity of the proposed action and the no-action alternative on GHG emissions and determine the need for mitigation measures to reduce or offset impacts.

The project would have a significant impact if it would:

a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment; or
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases.

No Action Alternative

Under this alternative, no construction activities would take place in the project area, therefore no construction-related GHG would be produced.

Proposed Action Alternative

Under this alternative, while project construction activities and vehicular travel to and from the work sites by employees would result in GHG emissions, the exhaust from construction activities and vehicle traffic would be a temporary single source of GHG generated by the proposed project over pre-project conditions. The nature of the proposed project is not indicative of potential long-term increases in greenhouse gases. The estimated 790 metric tons of CO_2 increase due to construction activities would be short-term and would not exceed the 25,000 metric tons of CO_2-equivalent GHG emissions' threshold based on NEPA guidance and would have a less then significant impact on the environment.

GHG emissions would not be cumulatively significant considering the amount of GHG emissions generated by the project. The proposed project is consistent with the USFWS goals and objectives, including the promotion of habitat connectivity and integrity (U.S. Fish and Wildlife Service 2010). The proposed action would facilitate the movement of native fish species.

The State of California has adopted several regulations related to GHG emissions reduction (California Air Resources Board 2012). These include efforts to reduce tailpipe emissions and diesel exhaust produced by fuel-combustion engines. Project operations would adhere to statewide efforts aimed at minimizing GHG emissions. As such, the proposed project would not conflict with any identified plans adopted for the purposes of reducing GHG emissions and would result in less than significant impacts.

3.8 Hazards and Hazardous Wastes

3.8.1 Affected Environment

Hazardous materials management involves the prevention of illegal hazardous materials actions on public lands; the proper authorization, permitting, and regulation of the uses of hazardous materials; and the timely, efficient and safe responses to hazardous materials incidences. Federal, state, and local agencies regulate hazardous materials and hazardous waste. Nonetheless, illegal storage and disposal and unintentional releases of hazardous materials or waste from leaks and accidents can occur when hazardous materials are used or hazardous waste is generated by a project.

Under the California Code of Regulations (CCR), Title 13, Section 1150-1194, and CFR Title 49, the California Highway Patrol (CHP) regulates the transport of hazardous materials. When a spill of hazardous material or waste occurs on a highway, such as SR 99 East, the CHP is responsible for directing cleanup and enforcement (CCR Section 2450-2453b).

There nearest private airstrip is located at the intersection of Reed and Orchard roads, 4.5 miles from the project site. The site is listed as a California Department of Toxic Substances Control (DTSC) hazardous waste and substances site. The site, the Vina Auxiliary Field, is listed with no contaminants found and no further cleanup action needed as of September 8, 2008.

The project site is located within an area that is designated as a Non-Very High Fire Hazard Severity Zone on the Tehama County Fire Hazard Severity Zone map (California Department of Forestry and Fire Protection [CAL FIRE] 2019).

3.8.2 Environmental Consequences / Impacts and Mitigation Measures

Methodology

The hazards and hazardous wastes analysis is based upon a review of a governmental record search of the DTSC EnviroStor database (California Department of Toxic Substances Control 2019). An impact related to hazards and hazardous materials would be significant if the project would:

a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials;
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment;
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school;
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would create a significant hazard to the public or the environment;
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, the project would result in a safety hazard for people residing or working in the project area;
f) For a project within the vicinity of a private airstrip, the project would result in a safety hazard for people residing or working in the project area;
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan; or
h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands.

No Action Alternative

Under this alternative, no construction activities would occur and thus there would be no risk of hazard to the public through the transport, use, or disposal of hazardous materials; nor would this alternative interfere with emergency response and evacuation plans. Since the project area is not located within an airport land use plan or in the vicinity of a private airstrip, this alternative would not result in an airport safety hazard. Similarly, there would be no impact on wildland fire potential or catastrophic fire behavior because the project would not be implemented.

Proposed Action Alternative

Under this alternative, activities associated with the proposed project would utilize potentially hazardous materials associated with the project construction and operation of vehicles and construction equipment during project implementation including oil, fuels and concrete. These materials are similar to those routinely used for other types of construction projects throughout Tehama County. The widespread use and associated transport of these materials along the highways and county roads that traverse Tehama County, combined with the low level of incidents (spills), suggest that impacts related to project activities would be similar to those found elsewhere in the county. Given the temporary nature of project construction, the risk of hazardous materials spills is relatively low, however the potential release of these hazardous materials is considered a potentially significant impact.

This project would not emit hazardous emissions or require handling of hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school. The project is not located on a site included on a list of hazardous materials sites that would create a significant hazard to the public or the environment, nor is it located within two miles of a public or private airport or airstrip.

Under the proposed project, construction traffic would include the trucks traveling to and from the site over the course of the construction period. Construction traffic would also include daily trips for personnel and routine service and supply vehicles. Accessing the project area would not impede emergency response and evacuation plans. The impacts created would be less than significant.

Construction activities are a potential source of wildfire ignition. The vegetation in the project area is composed of a fire-adapted vegetation community and is susceptible to wildfire, however the project is

located in an area designated as a Non-Very High Fire Hazard Severity Zone. Under the proposed project, construction activities would occur within, or adjacent to the riparian corridor of Deer Creek. Potential fuels within the boundaries of the site are generally noncontiguous and the creek serves as a substantial natural firebreak. The types and amounts of fuels and their continuity may be decreased temporarily by implementation of this alternative, particularly in areas subject to vegetation removal, but any such changes would not be significant with respect to fire potential and behavior. In the long-term, potential fire conditions would be similar to those that currently exist. The proposed project would have a less than significant impact on wildland fire potential and behavior.

The following measures would be implemented to avoid and minimize impacts related to hazards and hazardous wastes and to mitigate potentially significant impacts listed above related to hazards and hazardous wastes to less than significant levels:

HAZ-1: A designated concrete washout area will be located at least 100 feet from any high water mark within adjacent waterways, and from any wetlands and will be developed and used following the U.S. EPA Stormwater BMP for a Concrete Washout.

HAZ-2: BMPs will be developed and implemented to ensure that wet concrete does not enter Deer Creek or other aquatic sites during construction.

HAZ-3: Measures WATER-3 through WATER-6 associated with potential petroleum product spills will be fully implemented.

HAZ-4: Construction equipment and materials shall not be stored or stockpiled in the creek channel, and shall be stored at least 50 feet from the top of the stream bank, any wetlands or other aquatic sites.

3.9 Hydrology and Water Quality

3.9.1 Affected Environment

Flood Control

The lower reaches of Deer Creek have long been a flooding concern to local property owners and government officials. Publicly-maintained flood control improvements along Deer Creek represent some of the oldest such facilities in Tehama County. They are part of an Army Corps of Engineers project constructed in 1949 under the 1944 Flood Control Act (Public Law No.534), that involved channel clearing, excavation, levee construction in two separate locations, and rock bank protection. The original Deer Creek Channel Improvement extends a distance of 7.4 miles from a point 0.7 miles above Delaney Slough to its junction with the Sacramento River. Specific project works originally authorized by Congress included:

- The cleared and excavated channel of Deer Creek extending from upstream of Delaney Slough downstream to the Sacramento River,
- Levees on both banks of Deer Creek built along low-lying areas between Delaney Slough and the Sacramento River,
- Rock bank protection at various places between the Southern Pacific Railroad and the Sacramento River, and
- Levee along the left (south) bank of Deer Creek from Delany Slough upstream 0.7 miles to high ground.

Routine maintenance of the levees generally consists of vegetation control on the levees, access road repairs, minor repairs to bank protection features, and drain pipe cleaning (The Habitat Restoration Group 1998). The *Deer Creek Watershed Management Plan* (The Habitat Restoration Group 1998) presents a summary of the damage which has occurred to the Deer Creek channel, banks, and levees as a result of flood flows and the

repairs undertaken to restore the integrity of the flood control project, we refer the reader to this document for additional information. Presently, flood management policy for the Deer Creek watershed is in the form of non-specific county and Federal Emergency Management Agency (FEMA) guidelines. The FEMA maps indicate a classification of Zone A for areas along Deer Creek in the lower watershed from about two miles northeast of the Stanford-Vina Irrigation Diversion Dam to the Sacramento River. The FEMA defines Zone A as areas of 100-year flood; where base flood elevations and flood hazard factors have not been determined (The Habitat Restoration Group 1998).

The *Deer Creek Watershed Strategy* (U.S. Fish and Wildlife Service 2018) states that, with the preparation of a *Deer Creek Flood Plan*, it seeks to investigate the feasibility of setting back levees, restoring natural channel processes, increasing the width of the riparian corridor and enhancing /resorting native vegetation. In addition, the CALFED Bay-Delta Program, in its February 1999 *Revised Draft Strategic Plan for Ecosystem Restoration,* (U.S. Fish and Wildlife Service 2018) also suggests the objective of setting back levees that border the 10 miles of the lower creek channel. This action would demonstrate the benefits of alternative flood management and provide floodplain storage of flood flows, while restoring channel meander, channel-floodplain interaction, riparian succession, and gravel recruitment and transport.

Water Quality

DWR completed a comprehensive three-year water quality study in 1999 (Sacramento Watershed Program 2018). Temperature is one concern in Deer Creek, and the US Forest Service, CDFW, and private timber companies continue to monitor temperature conditions at numerous locations in the watershed. Water quality in Deer Creek is considered good with the exception of temperature conditions during times of low flow. Potential aquatic habitat impacts from upper watershed erosion is another concern. SR 32 is a main transportation route that parallels much of Deer Creek, and has caused concern over the possibility of a spill event that could impact the stream and aquatic life.

USGS bed sediment and fish / mollusk tissue sample in the Deer Creek watershed indicated that mercury concentrations were insignificant (The Habitat Restoration Group 1998). Water quality data from DWR's SR 99 station reported a range of <0.0004 to <0.001 mg / l for mercury (below the laboratory detection level).

Groundwater Quality

The project site is located within the Sacramento Valley Groundwater Basin (SVGB) in the Dye Creek and Los Molinos sub basins. Groundwater in the SVGB is typically sufficient for municipal, industrial and agricultural uses, averaging less than 280 milligrams (mg) / liter (l) Total Dissolved Solids (TDS). This range is below both the California and EPA secondary drinking-water standard of 500 mg / l TDS and the agricultural water quality limit of 450 mg / l TDS.

Hydrologic Analysis

The USGS stream gage (#11383500) used to analyze the historical flow is located on Deer Creek approximately 0.5 miles upstream of the DCID dam. The period of record for this gage is from October 1911 to September 1915 and from March of 1920 to the current year. A flood flow frequency curve was developed for Deer Creek analyzing 50 years of data from 1961 through 2011. The frequency curve, observed peak flows, and upper and lower confidence limits are shown in Figure 19. The curve was created using the Log-Pearson Type III distribution based on maximum flood peaks for each year. The 100-year, 50-year, 10-year, and two-year flood events are 27,800 cfs, 23,200 cfs, 13,900 cfs and 6,000 cfs, respectively.

Water Rights

The Stanford-Vina Ranch Irrigation Company (SVRIC) was established about 1918 and was granted water rights by the State Water Commission to divert 15 cfs from Deer Creek for agricultural purposes. The DCID was established about 1923. In 1926 the Tehama County Superior Court adjudicated 100 percent of the water in Deer Creek to be split between SVRIC and DCID at 65 percent and 35 percent, respectively. In 1926

changes were made to this original agreement which allowed for an additional 180 acres of riparian rights north of Deer Creek to be included in SVRIC's portion of the split. This made their portion of the water in the creek equivalent to 66.7 percent of the entire flow in Deer Creek, while DCID received 33.3 percent of the entire flow (The Habitat Restoration Group 1998).

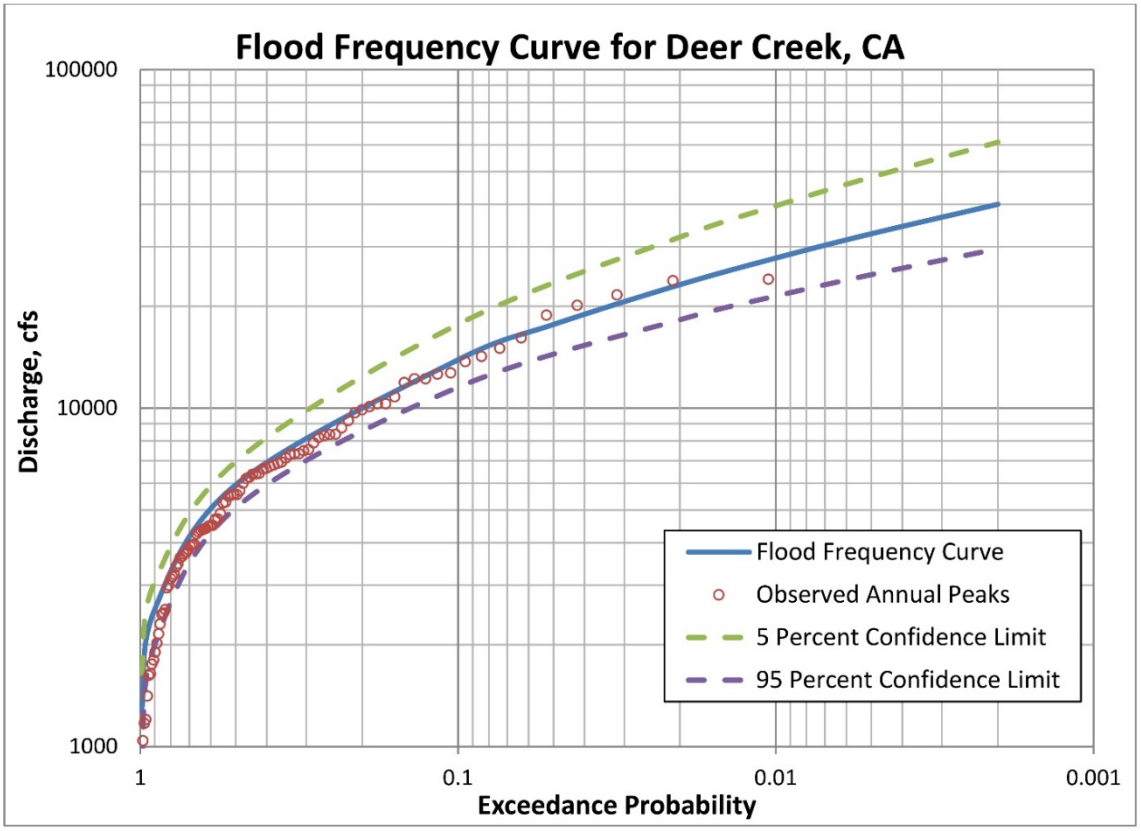


Figure 19. Flood Frequency Curve for Deer Creek

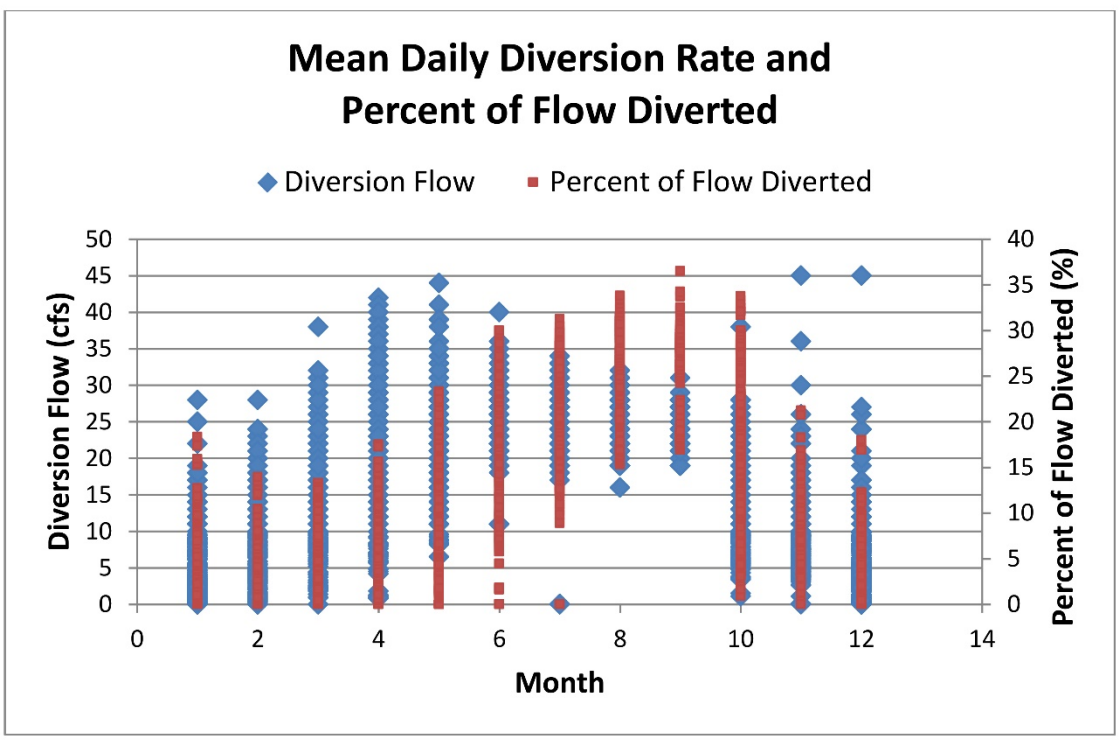


Figure 20. Mean Daily Diversion Rate and Percent of Flow Diverted

A statement of water diversion and use for the State Water Rights Board was filed on May 2, 1967 that states the capacity of the diversion ditch is approximately 60 cfs. Based on the diversion flow records from water years 1999 through 2012, DCID diverted 36 cfs or less 99.4 percent of the time. The mean recorded daily diversion rate and percent of flow diverted from Deer Creek is shown in

Figure 20. The average mean daily diversion flow throughout the period of record is 23 cfs. The maximum diverted flow recorded was 45 cfs, although water was observed spilling out of the ditch onto the surrounding low terrain during this diversion. The current capacity of the ditch is approximately 36 cfs, based on visual observation and hydraulic modeling. The design diversion flow used for this analysis was 36 cfs.

3.9.2 Environmental Consequences / Impacts and Mitigation Measures

Methodology

Impacts on water quality and hydrology were evaluated by analyzing regional and site-specific reports. The analysis was conducted through document review and site visits.

Significant impacts would occur to the water quality and hydrology if the project would:

a) Violate any water quality standards or waste discharge requirements;
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted);
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation onsite or offsite;
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding onsite or offsite;
e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff;
f) Otherwise substantially degrade water quality;
g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map;
h) Within a 100-year flood hazard area, structures which would impede or redirect flood flows;
i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam; or
j) Inundation by seiche, tsunami, or mudflow.

No Action Alternative

Under this alternative, the roughened channel would not be constructed downstream of the dam to raise the water surface below the dam. The existing diversion ditch elevation would not be lowered. The existing structures would all remain in place. Stream flows would continue to be diverted and no changes in water quality would occur.

Proposed Action Alternative

Under this alternative, minor, short-term impacts are expected to occur to water quality and hydrology during construction. Water quality impacts such as short-term minor increases in turbidity and suspended sediment concentrations would likely occur due to project activities following instream construction during the rewatering process and potentially during the initial winter following construction due to erosion from the project construction areas. This is considered a potentially significant impact.

Water quality impacts such as causing a significant increase in alkalinity of the water in Deer Creek could occur if work were to occur when the ditch was flowing and water return flows with wet concrete were to re-enter the creek from the irrigation ditch. This is considered a potentially significant impact. Water quality impacts to Deer Creek could occur if fuel, oil, other petroleum products or wet concrete were accidentally spilled as a result of construction activities and entered surface waters. This is considered a potentially significant impact.

There would be no expected impacts to the potential flooding of adjacent properties, nor the performance of the project or the local infrastructure. The roughened rock ramp will be constructed of large rock designed to remain stable during a 100-year flow event. The local increase in water surface elevation is contained by the natural terrain with steep hill slopes extending well above the 100-year water level confining the flow. The proposed project footprint would not increase the total diversion facility footprint at the site and would not be expected to negatively affect flood levels upstream of the site.

There would be no expected impacts to water quality due to the redistribution of mercury from suspended sediments. The redistribution of sediments during and following construction would likely cause a minor temporary increase in turbidity in Deer Creek. However, the Deer Creek watershed does not have a significant mining history or known mercury issues and BMPs would be used to minimize turbidity.

This alternative would not violate any water quality standards or waste discharge requirements, impact groundwater supplies, significantly alter existing drainage patterns, increase onsite or offsite flooding, contribute additional runoff water, place housing within flood hazard areas, place structures that would impede or redirect flood flows, expose people of structures to flooding impacts, or cause inundation by seiche, tsunami or mudflows.

The following measures would be implemented to avoid and minimize impacts to water resources and water quality and to mitigate potentially significant impacts to water resources and water quality to less than significant levels:

WATER-1: All construction shall be conducted in the summer / early fall during the low flow period. Any work within the channel and banks, outside of this instream work window must be isolated from flowing water and dewatering will be required.

WATER-2: Monitoring of water turbidity and settleable materials shall be conducted in accordance with the Clean Water Act Section 401 Certification through consultation with the RWQCB.

WATER-3: All equipment and machinery that contains fuel, oil or other petroleum products used during construction-related activities shall be checked for petroleum leaks immediately prior to being mobilized to the project site, and again each day prior to use.

WATER-4: All equipment refueling and / or maintenance shall take place within a secondary containment structure and a minimum of 100 feet away from Deer Creek, any wetlands or other aquatic sites.

WATER-5: An emergency spill kit and absorbent oil booms will be onsite during construction activities.

WATER-6: All equipment operations within the channel and banks of Deer Creek will be required to use readily biodegradable hydraulic oil.

WATER-7: A dewatering permit will be obtained from the RWQCB, if deemed necessary based on the dewatering methods used.

3.10 Land Use / Planning

3.10.1 Affected Environment

The Tehama County General Plan designation for the project site is Upland Agriculture (U-A). The Tehama County zoning designations within the project site are zoned Agricultural / Upland District (AG-1). The project site is within the Central I-5 Corridor Planning Unit in the Tehama County General Plan. This planning area is located in the central portion of the County and includes the communities of Los Molinos, Tehama, El Camino, Gerber, Proberta and Dairyville. This area supports large land areas held in public ownership, and lands utilized for agriculture and grazing. Road access within the Central I-5 Corridor Planning Unit is provided primarily by Interstate Highway 5 (I-5) and SR 99-East and SR 99-West, which runs north-south across the central portion of the County. The primary east-west running county roads in the Central I-5 Corridor Planning Unit are Flores Road, Gyle Road and Red Banks Road which runs generally north-east and south-west. The primary north-south running county roads in the Central I-5 Corridor Planning Unit are Paskenta Road and Rawson Road.

3.10.2 Environmental Consequences / Impacts and Mitigation Measures

Methodology

The methodology used for the land use impact analysis involved an assessment of the compatibility of the proposed project with relevant plans and policies, and a review of the Tehama County General Plan, and zoning in relation to surrounding land uses and site features. The analysis was conducted through document review, site visits and discussions with Tehama County staff.

Impacts to land uses would be significant if they would:

a) Physically divide an established community;
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect; or
c) Conflict with any applicable habitat conservation plan or natural community conservation plan.

No Action Alternative

Under this alternative, no change of land use or activities would occur. Diverted flows from Deer Creek would continue to service the DCID customers and no changes would occur to the diversion system. There would be no impacts to the current land use.

Proposed Action Alternative

Under this alternative, no change in land use would occur. The project area is located within Tehama County's AG-1 land use zones, which limits land uses to further agriculture production and related activities. The proposed project fits within acceptable improvements in the land use zones and no further permitting through the county would be required. The proposed project remains consistent with the goals, policies, and objectives of the Tehama County General Plan and Zoning Ordinance and there would be no physical division of an established community. Project implementation would not interfere with, preclude, or conflict with existing land uses adjacent to the project area. There would be no conflicts with any applicable habitat conservation plan or natural community conservation plan. Because there would be no impact to land use, no mitigation is required.

3.11 Noise

3.11.1 Affected Environment

Noise concerns are described in terms of sensitive receptors, or noise-sensitive land uses within hearing range of the activity. No potential sensitive receptors (those within 600 feet of the project sites) were identified near the DCID site from aerial photography. The closest potential sensitive noise receptors to the site was a commercial gravel mining operation, approximately 0.5 miles, and a residence approximately one mile away. The area surrounding the site is remote rangeland. The nearest paved road to the site is Reed Orchard Road. There is limited daily traffic noise on the north and south public access routes due to rural agricultural and residential uses. Private gravel and unsurfaced roads access the project site from the north and south. There is existing ambient and background noise associated with Deer Creek, the irrigation ditch and varied wildlife and livestock activities. Varying ambient noise level at the diversion dam is dependent upon the amount of water flowing over the structures.

3.11.2 Environmental Consequences / Impacts and Mitigation Measures

Methodology

Construction noise related to the project site improvements are the focus of this analysis. Assumptions related to construction equipment and industry noise averages were used to evaluate construction-related noise impacts.

An impact related to noise would be significant if the project would cause:

a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;
b) Exposure of persons to or generation of excessive ground borne vibration or ground borne noise levels;
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project;
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project;
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, expose people residing or working in the project area to excessive noise levels; or
f) For a project within the vicinity of a private airstrip, expose people residing or working in the project area to excessive noise levels.

No Action Alternative

Under this alternative, the proposed project would not be implemented, therefore no change in permanent, temporary or periodic ambient noise levels would occur.

Proposed Action Alternative

Under this alternative, construction vehicles entering and leaving the project site would temporarily increase traffic levels and thus ambient noise levels along isolated paved and unpaved roads leading to the site. During the construction phase of the project, noise from construction activities would temporarily impact the environment in the immediate area. The noise levels of typical construction equipment that could be used to implement the project are shown in Table 7.

Table 7. Typical Construction Equipment Noise	
Equipment Description	**At 50 feet (Decibels-Acoustic, slow)**
Dozer	85
Front End Loader	80
Excavator	85
Concrete Mixer Truck	85
Roller or grader	85
Dump Truck	84
4" Pump	76

Source: Federal Highway Administration Roadway Construction Noise Model

There would be no permanent noise impacts resulting from implementation of the proposed project. However, adjacent landowners within the general vicinity of project construction at the site could encounter increased noise levels during construction activities, in excess of the Tehama County General Plan standards of 50 Energy-Equivalent Level (LEQ), depending on site-specific topography and vegetative screening. LEQ measures individual noises for a period of time (typically for one hour) and determines the average noise level. Mobile equipment such as excavators, loaders, etc., may operate in a cyclic fashion in which a period of full power is followed by a period of reduced power and noise. Any impacts would be temporary and localized and considered less than significant.

Recreational users in the general vicinity of the site could encounter increased noise levels during construction activities if they were near the project site during daytime hours on weekdays, however the impact would be temporary and localized. Recreational uses in the project area are very limited due to the fact that the project site and surrounding parcels are all located on private property with controlled access. Noise impacts to recreational uses are considered less than significant.

It is not anticipated that ground vibration created by project activities would be detectable at any sensitive receptor locations nor result in any structural damage. There are no noise-related impacts relating to public airports or privately owned airstrips adjacent to or within 2 miles of the project area. Because noise related impacts are less than significant, no mitigation is required.

3.12 Population and Housing

3.12.1 Affected Environment

The project site is located on several rural private parcels of varying acreage. In the vicinity of the project site, there are no residences or outbuildings within the affected environment.

3.12.2 Environmental Consequences / Impacts and Mitigation Measures

Methodology

Analysis of the potential population and socioeconomic impacts of the proposed project included qualitative assessments of potential impacts associated with housing, conflicts with county and local plans, population growth, displacement of persons and businesses, and community disruption.

The project would have a significant impact if it would:

a) Induce substantial population growth in an area, either directly (for example, by proposing new

homes and businesses) or indirectly (for example, through extension of roads or other infrastructure);

b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere; or
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere.

No Action Alternative

Under this alternative, there would be no impacts to the demographic or socioeconomic characteristics of the project, or surrounding area. The current land use and zoning, combined with the rural transportation infrastructure of the project area, limits substantial population growth and displacement.

Proposed Action Alternative

Under this alternative, the proposed project would not cause an economic or housing disruption through substantial population growth in an area, either directly or indirectly. The project improves fish passage conditions at an agricultural diversion, however it does not extend the infrastructure or increase production capacity. The project structures currently serve only those customers with water rights from DCID. Modifications associated with the project would continue to provide irrigation water to sustain the current agricultural and residential needs. No short-term or long-term residential housing displacement or displacement of people would occur as a result of the proposed project. No new transportation infrastructure or businesses would develop as a result of the project that would directly or indirectly influence local or regional population growth. Since there are no impacts to nearby populations or housing, no mitigation is required.

3.13 Public Services and Utilities / Energy

3.13.1 Affected Environment

The utility needs for the DCID are self-contained and not dependent upon public infrastructure. Existing entitlements from the project area helps to service the agricultural irrigation water needs of the DCID.

3.13.2 Environmental Consequences / Impacts and Mitigation Measures

Methodology

An impact related to Public Services and Utilities / Energy would be significant if the project would:

a) Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:
    i. Fire protection
    ii. Police protection
    iii. Schools
    iv. Parks
    v. Other public facilities
b) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board;
c) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental

effects;

d) Require or result in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects;
e) Not have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed;
f) Not result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments;
g) Not be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs; or
h) Not comply with federal, state, and local statutes and regulations related to solid waste.

No Action Alternative

Under this alternative, no demand for public services would occur over the short-term or long-term. No utility needs would occur.

Proposed Action Alternative

Under this alternative, since the project would not require new or physically altered governmental facilities, there would be no environmental impacts on service ratios, response times or other public services performance objectives. Site irrigation needs would continue under existing entitlements. The project would not require new or existing utilities or service systems for wastewater treatment or storm water drainage.

Construction would result in the generation of solid waste associated with the project as well as other construction-related waste (e.g., garbage, containers, and oil). The project would dispose all generated solid waste in a landfill with sufficient permitted capacity, and would comply with federal, state, and local solid waste statutes and regulations. Disposal of potentially hazardous waste is further evaluated in Section 3.8, Hazards and Hazardous Wastes. Construction would not have a significant effect on local or regional energy sources. Contractors would be responsible for their own utilities during construction activities. No impacts would result to public utilities and services in the project area as a result of the proposed project and as such no mitigation is required.

3.14 Recreation

3.14.1 Affected Environment

The parcels upon which the project sites are located, along with the surrounding parcels are all privately owned. These parcels include portions of Deer Creek where recreation use is unknown. Recreational activities that occur around the project area include hunting, fishing, wildlife viewing, and hiking, however access to the project area itself is limited due to the fact that the properties are held in private ownership with controlled access. There are no developed regional or neighborhood parks or other recreational facilities within or directly adjacent to the project site.

3.14.2 Environmental Consequences / Impacts and Mitigation Measures

Methodology

Analysis of potential recreation resource impacts consists of identifying recreational resources near the project area to determine whether project implementation would impact them. In addition to evaluating the impacts on recreational resources, an evaluation was made of the project's consistency with Tehama County recreation objectives.

Impacts associated with recreational uses would be significant if the project would:

a) Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated; or
b) Include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment.

No Action Alternative

Under this alternative, no change in recreational uses would occur. The types of recreational activities within the project area, as well as upstream and downstream of the diversion dam would remain unaffected. Potential recreational benefits, in the form of increased fish populations as a result of the proposed project, would not occur.

Proposed Action Alternative

Under this alternative, project construction activities would be coordinated with all project site landowners. During project construction activities, a limited duration of increased noise in the general area of the project site would occur that could potentially impact recreational uses for a short time, in particular hunting activities in the general area. However, because recreational use of the area appears to be light, and recreational uses are also available farther away from the project sites, coupled with the fact that the impact would be short in duration, this is considered a less than significant impact.

Beneficial impacts to recreation may result from increased fish populations, both locally and regionally. Mitigation measures that have been developed for potential water quality impacts will be implemented to make sure that any materials released into the river from construction activities that could cause a nuisance or adversely affect recreation uses would not result in a significant impact. The project would not increase or require the construction / expansion of recreational parks or facilities and there would be no adverse physical environment effects or deterioration of recreational facilities. As such, no mitigation is required.

3.15 Soils / Geology / Minerals

3.15.1 Affected Environment

Soils

Ten different soil map units occur within the project area (Figure 21) according to the local soil survey (Soil Conservation Service et al. 1967). The ten identified map units are listed below:

<u>Anita cobbly clay (An)</u>

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

<u>Keefers loam, 0 to 3 percent slopes (Kf)</u>

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

Millrace gravelly fine sandy loam, 0 to 3 percent slopes (Mp)

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

Molinos fine sandy loam (My)

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

Molinos complex, channeled (Mzt)

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

Riverwash (Rr)

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

Toomes extremely rocky loam, 1 to 50 percent slopes (ThE)

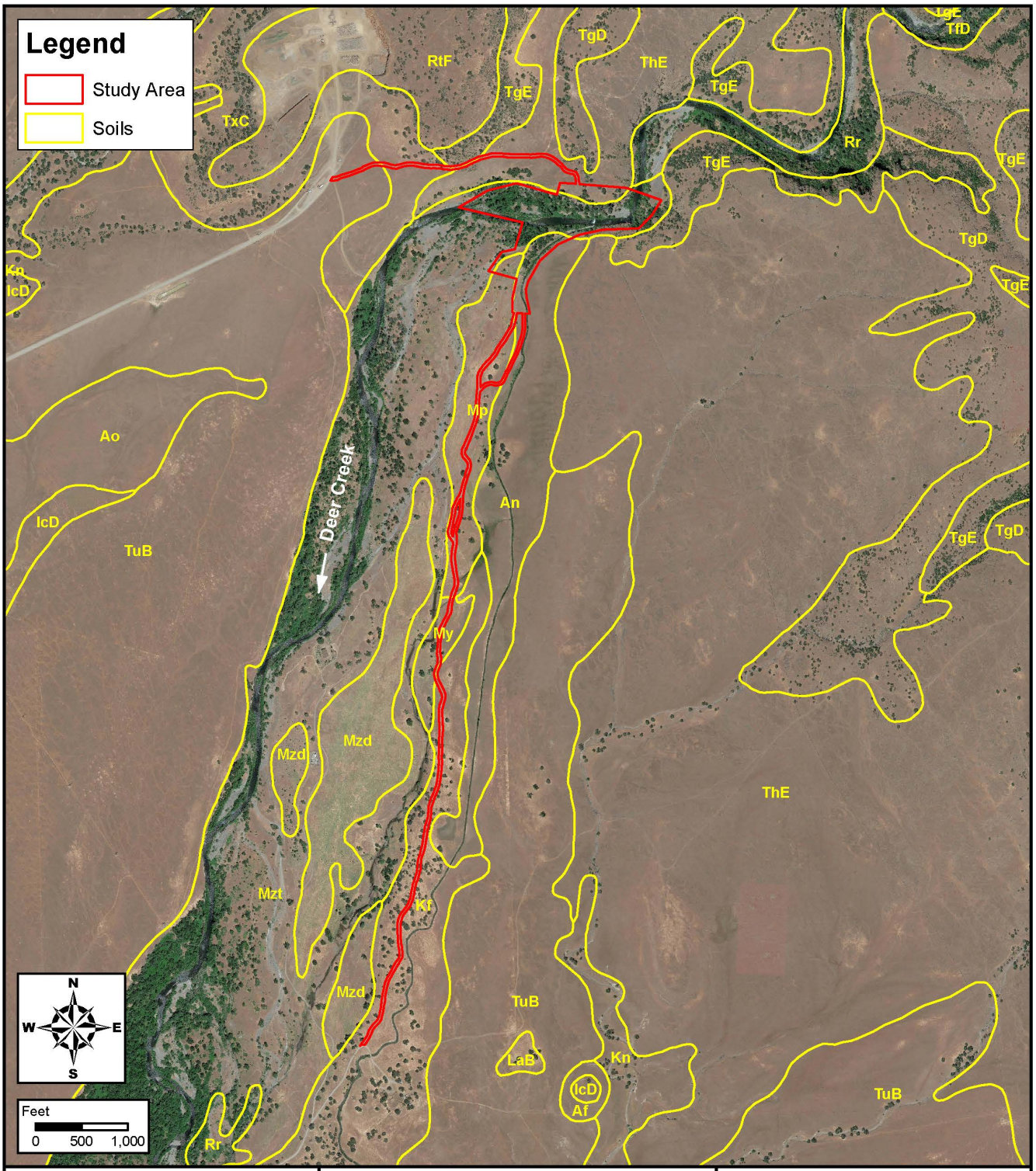
These soils are located east of the Sacramento River, formed in material derived from volcanic rock. They are well-drained with moderate permeability and medium runoff. The taxonomy of the map unit is lithic, loamy, mixed, thermic, Ruptic-Xerorthentic Xerochrepts (Natural Resources Conservation Service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

Toomes very rocky loam, 30 to 50 percent slopes (TgE)

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

Tuscan cobbly loam, 1 to 5 percent slopes (TuB)

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



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Deer Creek DCID Dam Fish Passage Project

Tehama County, California

March 2019

Soil Survey Map

DATA SOURCE: USDA Natural Resources Conservation Service, September, 2017

PHOTO SOURCE: Google Earth, 5/25/2017

Figure 21. Soil Survey Map

Tuscan very stoney loam, 3 to 15 percent slopes (TxC)

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

Geology

The project site is located in the Great Valley geomorphic province of California, which is an alluvial plain approximately 50 miles wide and 400 miles long in the central part of California. The Great Valley is a structural depression that has been filled with a thick sequence of Mesozoic and Tertiary marine sediments covered by Quaternary alluvial sediments. Subsequent deformation has folded these older sediments into a northwest-trending asymmetrical syncline with its axis off-center toward the Coast Range. The sedimentary deposits are up to 50,000 feet thick along the axis of the syncline.

The project site is located on the perimeter of the valley nearest to the Cascade Range at an elevation of approximately 470 feet above sea level. The creek within the project area is incised in cemented alluvium units (Riverbank Formation, Red Bluff Formation, and other terrace gravels). The alluvial fan is bounded by bluffs formed of older geologic units. The channel upstream of the dam is composed of coarse cobbles and the creek is bounded by a steep-walled canyon. Downstream of the dam the channel is composed of large cobble and the creek has low channel banks where overbank flow occurs quite regularly.

The creek channel in this area has not changed much since 1938. The flood corridor width has only changed about 0.02 percent since 1938 (California Department of Water Resources 2018). Since 1938 the low flow channel width has increased by approximately 7.2. No visible evidence suggests that the creek bottom is significantly changing over time. Some localized scour is occurring downstream of the dam due the plunging flow over the dam. This reach of the creek has classic riffle-pool morphology and likely has high sediment transport capacity during high flows. There is a riffle approximately 600 feet downstream of the dam that is likely controlling the water surface elevation. Immediately upstream of the dam is a very sharp bend with a deep pool that may provide holding habitat for adult salmonids. Approximately 600 feet upstream of the dam another riffle exists. The slope between the two riffles is about 0.3 percent.

3.15.2 Environmental Consequences / Impacts and Mitigation Measures

Methodology

The soils, geology and mineral resources analysis is based on information in the *Soil Survey of Tehama County, California* (Soil Conservation Service et al. 1967), and a review of reports regarding regional geology, soils, and mineral resources, as well as the Alquist-Priolo Earthquake Fault Zoning Map (California Department of Conservation 2019).

Significant impacts would occur if the project would:

a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:

   i. Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.
   ii. Strong seismic ground shaking.
   iii. Seismic-related ground failure, including liquefaction.
   iv. Landslides.

b) Result in substantial soil erosion or the loss of topsoil;
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse;
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property;
e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water;
f) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state; or
g) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan.

No Action Alternative

Under this alternative, there would be no impact to soils, geology or mineral resources due to the fact that the roughened channel would not be constructed downstream of the dam to raise the water surface below the dam. The existing diversion ditch elevation would not be lowered. The existing structures would all remain in place.

Proposed Action Alternative

Under this alternative, the project would not expose people or structures to potential substantial adverse effects such as ruptures of known earthquake faults, strong seismic ground shaking or ground failures. The Alquist-Priolo Earthquake Fault Zoning Act (1972) and the Seismic Hazards Mapping Act (1990) direct the State Geologist to delineate regulatory "Zones of Required Investigation" to reduce the threat to public health and safety posed by earthquake-triggered ground failures. Cities and counties affected by the zones must regulate certain projects within them. A search of the Alquist-Priolo Earthquake Fault Zoning Map (http://www.quake.ca.gov/gmaps/WH/regulatorymaps.htm) shows there are no Earthquake Fault Zones or Landslide and Liquefaction Zones of regulatory interest within or surrounding the project area. The project does not include elements that would cause ground failure (including liquefaction) or landslides.

The project would not be located on expansive soil or a geological area that is unstable, or that would become unstable which could result in landslides, lateral spreading, subsidence, liquefaction, collapse or create substantial risks to life or property. No waste water disposal would occur requiring soil capable water disposal systems. The plan would not result in the loss of a local mineral recovery site or a regional or state valued mineral resource. Construction-related ground disturbances would occur as a result of the rock ramp construction downstream of the dam and the lowering of the existing diversion ditch elevation. Substantial soil erosion could occur as a result of the ground disturbance which is considered a potentially significant impact.

The following measures would be implemented to avoid and minimize impacts to soils, geology and mineral resources and to mitigate potentially significant impacts listed above to less than significant levels:

SOIL / GEO / MIN-1: After ground-disturbing activities are complete, all disturbed areas (outside of the active stream channel) shall be seeded with native plant species and / or mulched as described in the revegetation plan and the Stormwater Pollution Prevention Plan (SWPPP), if required.

SOIL / GEO / MIN -2: Construction of all project actions shall comply with RWQCB Basin Plan Objectives. Standard BMPs will be incorporated into the project designs and / or the SWPPP, if required.

SOIL / GEO / MIN -3: If the total disturbance area is greater than one acre, a Notice of Intent will be submitted to the State Water Resources Control Board to obtain coverage under the National Pollution

Discharge Elimination System General Permit for Discharges of Stormwater Associated with Construction Activity.

3.16 Transportation / Traffic

3.16.1 Affected Environment

SR 99 East is the main highway near the project site. Access to the project site is found by heading east on Vina Road from SR 99 East near Vina, California. Vina Road meanders through farmland and ends at Leninger Road. Head north on Leininger Road for about a half mile, then east on Reed Orchard Road for another four miles. The project site is located almost two miles further down an unnamed unpave road through several closed farm gates. This access route leads to the left bank of Deer Creek. Access to the right side of the creek is assessable by staying on Leininger Road past Reed Orchard Road for about 1.5 miles where the road turns into Rock Quarry Road, which is a gravel surfaced road. Continue traveling about 4.5 miles and turn right onto a private unsurfaced road just past the rock quarry.

The project area is rural and surrounded by private property. The mostly unpaved roads are commonly used for agricultural operations. Vehicle and heavy machinery access to the project area would occur on existing roads and to the extent possible, existing parking areas on the private unpaved project access road would be employed for equipment staging. Access roads may need new or additional rock material for repairs during and after construction.

During the construction period when the greatest number of workers and trucks would be required, approximate trips to the site are listed below.

- 350 trips for transportation of construction workforce
- 787 trips for transportation of construction materials

The following is the expected equipment list needed at the site:

- Excavator: 3
- Front Loader: 2
- 20-ton Dump Truck: 17
- Concrete Mixer Truck: 7
- Water Truck: 1
- Dozer: 1
- Roller or Grader: 1
- 4-inch Water Pump: 1

3.16.2 Environmental Consequences / Impacts and Mitigation Measures

Methodology

A qualitative assessment of traffic and transportation effects was performed, based on the construction procedures and equipment that would be used and site review of existing conditions.

An impact related to transportation and traffic would be significant if the project would:

a) Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit;
b) Conflict with an applicable congestion management program, including, but not limited to level

of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways;

c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks;
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment);
e) Result in inadequate emergency access; or
f) Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities.

No Action Alternative

Under this alternative, no direct transportation / traffic effects would occur. The project area is rural in nature.

Proposed Action Alternative

Under this alternative, project construction activities would require truck and worker trips on SR 99 East, Reed Orchard Road, Rock Quarry Road and the privately owned gravel and unsurfaced roads to access the project site. The primary access to the project area would be from SR 99 East to Reed Orchard Road. Rock Quarry Road would only be used to transport equipment and materials to construct, and deconstruct the temporary diversion system. The proposed project would increase vehicle trips and type of equipment transported on these routes. Construction vehicles would temporarily increase traffic levels on four miles of unpaved private roads from Reed Orchard Road. Construction equipment would be mobilized to the site prior to project activities and would be moved upon completion of these activities.

Throughout construction, the amount of daily construction equipment traffic would be limited by staging the construction vehicles and equipment within the project boundary for the duration of work. Post-construction activities (i.e. revegetation, maintenance and monitoring) would require intermittent access for approximately one to three years, depending on funding.

The potential increase in traffic generated from construction along SR 99 East would be localized and minimal. Project related traffic would not increase traffic on the local roads to a level that is substantial in relation to the existing traffic load, or capacity of the road system. Because of the relatively minor number of construction-related trips added to federal, state and local roads, and the temporary nature of construction traffic, the project is not expected to result in significant increases in traffic volumes. SR 99 East is a designated truck route that was built to withstand occasional use by heavy equipment and was designed to accommodate a mix of vehicle types, including heavy trucks. The project is not expected to add significantly to roadway wear-and-tear. Construction traffic would increase on the other local paved roads in conjunction with the various construction activities. The local roads over which project related trucks and heavy equipment must pass may have been constructed and / or maintained to support substantial volumes of truck traffic. The local roadways have previously provided and currently provide access for construction-related and maintenance activities on a regular continuous basis. Use of these roads by project related trucks and heavy equipment would likely not increase the wear-and-tear on the local roadways to a level which would result in adverse impacts on the road conditions due to roadway design and existing condition. Standard construction and transportation practices would also be implemented to reduce the potential adverse impacts on roadway conditions. Project-related impacts to traffic patterns, levels of service, loads and capacity of the road systems are considered less than significant.

Project construction activities would be managed to ensure that the rural roads serving as access to the project site would remain open to through traffic. Temporary traffic control may be necessary during mobilization and demobilization of heavy equipment; however no road closures are planned. Construction activities would not reduce / close existing traffic lanes, therefore, congestion caused by construction vehicles

accessing the work areas from local roads would be minimal and limited to the short-term duration of the project work. The project would largely involve weekday activity when the roads in the general area would be lightly used. Project activities would not normally occur on weekends. Project-related impacts to congestion would be less than significant.

Project activities would not result in a change in air traffic patterns, nor would they substantially result in safety risks or increase hazards due to design features, or incompatible uses. Emergency access and parking capacity would not change as a result of project activities. The project activities also do not conflict with any Tehama County transportation plans or any other alternative transportation plans. The project would not conflict with CEQA Guidelines or a program, plan, ordinance or policy addressing the circulation system, nor would it result in inadequate emergency access. No changes to geometric design features would occur that would increase circulation hazards. As a result of the proposed project, impacts on transportation and traffic would be less than significant.

3.17 Cumulative Effects and Other CEQA and NEPA Considerations

This EA / IS includes a discussion of statutory considerations required under CEQA, such as cumulative impacts, the significant environmental effects of the proposed project, the significant effects that cannot be avoided if the proposed project is implemented, and growth-inducing effects of the project. Additional discussions are also required under NEPA, such as the significant irreversible and irretrievable commitments of resources and the relationship between local short-term uses of the environment and the maintenance of long-term productivity. These considerations are addressed below.

Cumulative Effects

This section provides a description of other actions in the area and a discussion of the cumulative impacts of those projects, in combination with the previously identified effects of the proposed project. A cumulative impact is defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor, but collectively significant actions taking place over a period of time" (40 CFR 1508.7). CEQA Guidelines Section 15355 states that "cumulative impacts refers to two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts.

a) The individual effects may be changes resulting from a single project or a number of separate projects.
b) The cumulative impact from several projects is the change in the environment which results from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable probable future projects. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time."

Changes to the local environment will be made through project construction activities on Deer Creek at the DCID diversion dam. The objective of the project is to improve upstream and downstream passage at the diversion dam for adult and juvenile salmonids and Pacific lamprey while meeting DCID's irrigation needs. The proposed project would improve fish passage for native species. Improving fish passage at this site will improve anadromous fish access to spawning, rearing and holding stream habitat upstream of the project site through the roughened rock ramp, and will improve anadromous fish passage, downstream of the project sites through fish screen and bypass pipe modifications. Improving habitat connectivity is an important factor that helps reduce the risk of extinction of species and populations from environmental changes. Effects of the proposed project would be positive towards maintaining the human quality of life environment. Overall, the proposed project would cause short-term impacts to some environmental resources. Mitigation

measures would result in these impacts being less than significant. Analysis for the individual resources considered in this EA / IS are described within the individual sections of this document.

There are several watershed restoration projects and RPMs that have been implemented by the Deer Creek Watershed Conservancy, CDFW, USFWS and others over the past approximately 20 years. These projects include, but are not limited to fish passage improvement, flow enhancement, development of conservation easements, riparian habitat restoration, outdoor education, pasture restoration, agricultural and timber preservation zoning, stream bank stabilization, non-native vegetation control and fuels management.

The cumulative impacts of these projects and the Deer Creek DCID Dam Fish Passage Project are not anticipated to be negative, and in fact should improve natural resource conditions for anadromous fish and other native species in the Deer Creek watershed. In addition, AFRP and the state resources agencies have recently implemented, and are planning several other anadromous fish passage improvement projects on several Sacramento River tributary streams. The cumulative impacts of these projects and the Deer Creek DCID Dam Fish Passage Project are not anticipated to be negative, and in fact should improve natural resource conditions for anadromous fish and other native species in the larger Sacramento River watershed.

Irreversible and Irretrievable Commitments of Resources

NEPA (Section 102) and the CEQ NEPA implementing regulations (40 CFR 1502.16), require a discussion of "any irreversible and irretrievable commitments of resources which would be involved in a proposed project should it be implemented." Section 15126.2(c) of the CEQA Guidelines also requires a discussion of the significant irreversible environmental changes that would result from implementation of a proposed project.

Implementation of the proposed project would not involve the substantial use of nonrenewable resources in such a way that would result in conditions which would be irreversible though removal or nonuse thereafter. Implementation of the proposed project would result in the use of fossil fuels, a nonrenewable form of energy for construction activities. A relatively minor amount of nonrenewable resources would be used in the project construction, transport of equipment and personnel, and related activities at the project area. The material requirements for this project would be relatively minor compared to the overall demand for such materials, and the use of these materials would not have a significant adverse effect on their continued availability. Future generations would not be committed to irreversible consequences or uses; the effect on future generations would be beneficial as a result of the restored stream ecosystem and related fishery resources. No irreversible damage from environmental accidents would be foreseeable in association with the proposed project.

Local Short-Term Uses and Long-Term Productivity Relationship

Section 102 of the CEQ NEPA Regulations and CFR 1501.16 require that an environmental document include a discussion of "the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity." The proposed project does not involve a trade-off between a "local short-term use" of the environment and the maintenance and enhancement of the environment in the sense contemplated by NEPA. Implementation of the proposed project is intentionally aimed at restoring and enhancing the long-term biological and environmental productivity of the fishery resource in Deer Creek and downstream in the Sacramento River system. Construction impacts associated with the proposed project would be short-term and temporary. Short-term effects to the environment from construction include soil erosion, air quality emissions, noise, disturbance to fish, wildlife, vegetation and wetlands, and temporary surface water quality impacts. In the long-term, however, the proposed project would improve passage conditions for native fish species, including several state and federally listed species. Implementation of the proposed project would not sacrifice the long-term productivity of the project area for short-term uses during construction.

Growth-Inducing Impacts

Under CEQA, growth itself is not assumed to be particularly beneficial, detrimental, or insignificant to the environment. If an action is determined to be growth-inducing, an evaluation is made to determine whether significant impacts on the physical environment would result from that growth. Analysis of growth-inducing impacts includes those characteristics of an action that may encourage and facilitate activities which would affect the environment, either individually or cumulatively. For example, an increase in population may impose new burdens on community service facilities. Similarly, access route improvements may encourage growth in previously undeveloped areas. Implementation of the proposed project would not contribute to significant development or economic growth in the vicinity. No businesses would be established or housing required as a result of this project. Therefore, no growth inducement would result from implementing the proposed project.

3.17.1 Environmental Commitments and Mitigation Measures

Because this document is a joint NEPA / CEQA document, mitigation measures have been identified for potentially significant impacts in compliance with CEQA requirements. Under CEQA, lead agencies are required to adopt a program for monitoring or reporting on the revisions that they required to be made part of the project, and other measures required to mitigate or avoid significant environmental effects. An MMRP for implementation of the proposed project will be developed to comply with CEQA. The mitigation measures that were identified as part of this analysis, and that will be included in the MMRP, are listed in Appendix F.

Significant Effects

CEQA establishes a duty for public agencies to avoid or minimize environmental damage where feasible (CEQA Guidelines Section 15021), and determinations of significance play a critical role in the CEQA process (CEQA Guidelines 15064). Potentially significant effects associated with implementation of the proposed project have been identified in the areas of:

- Air Quality
- Biological Resources
- Cultural & Tribal Cultural Resources
- Hazards & Hazardous Materials
- Hydrology / Water Quality
- Soils / Geology / Minerals

These potential effects are discussed in the individual resource sections in this document. As part of the environmental impact assessment for each resource area, mitigation measures have been identified that reduce potential impacts to less-than-significant levels. The environmental analysis conducted for the proposed project did not identify any effects that, after mitigation, remained significant and therefore unavoidable. No significant irreversible effects were identified associated with the proposed project.

4.0 Consultation and Coordination

Tribes, Agencies, and Organizations Contacted or Consulted

Letters were sent to Native American tribes in accordance with Section 106 of the NHPA. The California State Historic Preservation Officer is being consulted with, in accordance with Section 106 of the NHPA, regarding the project. NMFS and USFWS are being consulted with, in accordance with Section 7 of the ESA and CDFW is being consulted with, in accordance with the CESA, regarding the project.

Public Comments

An initial public scoping notice was published in the legal section of the Red Bluff Daily News on January 8, 2019. No comments were received. The Draft EA / IS was circulated through the State Clearinghouse for a 30-day public review from April 22, 2019 to May 22, 2019. Concurrent with the public review, a public notice was published in the legal section of the Red Bluff Daily News on April 22, 2019. No comments were received.

5.0 Compliance with Environmental Laws and Regulations

The following environmental laws and regulations will be complied with, as applicable, for the proposed project:

Table 8. Compliance with Environmental Laws and Regulations

Environmental Law / Regulation	Agency
Bald and Golden Eagle Protection Act	U.S. Fish and Wildlife Service
California Endangered Species Act	California Department of Fish and Wildlife
California Environmental Quality Act	Deer Creek Irrigation District
California Fish and Game Code Section 1600	California Department of Fish and Wildlife
California Water Code Sections 8710-8723	Central Valley Flood Protection Board
Clean Air Act	Tehama County Air Pollution Control District
Clean Water Act Section 401	Central Valley Regional Water Quality Control Board
Clean Water Act Section 402, National Pollution Discharge Elimination System – Construction Activities Storm Water General Permit	State Water Resources Control Board
Clean Water Act Section 404	U.S. Army Corps of Engineers
Endangered Species Act Section 7	National Marine Fisheries Service U.S. Fish and Wildlife Service
Magnuson-Stevens Fishery Conservation and Management Act	National Marine Fisheries Service
Fish and Wildlife Coordination Act	U.S. Fish and Wildlife Service California Department of Fish and Wildlife National Marine Fisheries Service
Migratory Bird Treaty Act	U.S. Fish and Wildlife Service
National Environmental Policy Act	U.S. Fish and Wildlife Service
National Historic Preservation Act Section 106	State Historic Preservation Officer
Executive Order 11990 Protection of Wetlands	U.S. Fish and Wildlife Service
Executive Order 11988 Floodplain Management	U.S. Fish and Wildlife Service
Executive Order 12898 Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations	U.S. Environmental Protection Agency

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7.0 References

Azat, J. 2014. Grandtab.2014.04.22. *California Central Valley Chinook Population Report.* California Department of Fish and Wildlife. URL http://www.calfish.org/tabid/213/Default.aspx.

Baldwin, B.G., and D.H. Goldman, D.J. Keil, R. Patterson, T.J. Rosatti, D.H. Wilken (eds.). 2012. *The Jepson Manual: Vascular Plants of California.* University of California Press, Berkeley and Los Angeles, California.

Bolster, B.C., editor. 1998. *Terrestrial Mammal Species of Special Concern in California.* Draft Final Report prepared by P.V. Brylski, P.W. Collins, E.D. Pierson, W.E. Rainey and T.E. Kucera. Contract No. FG3146WM. Prepared for the California Department of Fish and Game, Wildlife Management Division, Nongame Bird and Mammal Conservation Program. Sacramento, California.

Bureau of Land Management 1993. *Redding Resource Area Management Plan and Record of Decision*. Redding Resource Area, Redding, California.

CALFED Bay Delta Program. 2000. *Bay-Delta Program Ecosystem Restoration Program Plan. Volume 1: Ecological Attributes of the San Francisco Bay-Delta Watershed.*

California Air Resources Board. 2012. *California Greenhouse Gas Emission Inventory: 2000-2012*

California Department of Conservation. 2019a. *Alquist-Priolo Earthquake Fault Zoning Map.* URL (http://www.quake.ca.gov/gmaps/WH/regulatorymaps.htm). Accessed March, 2019.

California Department of Conservation. 2019b. *California Important Farmland Finder.* URL (http://maps.conservation.ca.gov/ciff/ciff.html). Accessed March, 2019.

California Department of Fish and Game. 1998. *A Status Review of the Spring-Run Chinook Salmon (Onchorhynchus tshawytscha) in the Sacramento River Drainage.* A report to the Fish and Game Commission. Candidate Species Status Report 98-01.

California Department of Fish and Game. 2005. *The Status of Rare, Threatened, and Endangered Plants and Animals of California 2000-2004*. The Resources Agency, Sacramento, California.

California Department of Fish and Wildlife. 2018. *California Natural Diversity Data Base [ds85]*. URL http://bios.dfg.ca.gov. Biogeographic Information and Observation System. Biogeographic Data Branch. Accessed May 2018.

California Department of Fish and Wildlife and California Attorney General Xavier Becerra. 2018. *California Department of Fish and Wildlife and California Attorney General Xavier Becerra Advisory: Affirming California's Protections for Migratory Birds*. Dated November 29, 2018.

California Department of Forestry and Fire Protection. 2019. *Wildland Hazard and Building Codes.* URL http://www.fire.ca.gov/fire_prevention_wildland_zones.php. Accessed March, 2019.

California Department of Toxic Substances Control. 2019. ENVIROSTOR. URL http://www.envirostor.dtsc.ca.gov/public/. Accessed March, 2019.

California Department of Water Resources. 2014. *Deer Creek Irrigation District Fish Passage Improvement Project Preliminary Engineering Technical Report.* Division of Integrated Regional Water Management, Northern Region Office.

California Native Plant Society. 2018. *Inventory of Rare and Endangered Vascular Plants of California, 7th Edition*. Sacramento California.

California Office of Historic Preservation. 1993. *Instructions for Recording Historical Resources*. State of California, Office of Historic Preservation, Sacramento, California.

Council on Environmental Quality and Governor's Office of Planning and Research. 2014. *NEPA and CEQA: Integrating Federal and State Environmental Reviews.* February 2014.

Dittes and Guardino Consulting. 2019. *Revised Survey for Special-status Vascular Plant Species for Deer Creek DCID Dam Fish Passage Project; Tehama County, California.* Prepared for Tehama Environmental Solutions, Inc., Red Bluff, California.

Environmental Laboratory. 1987. *Corps of Engineers Wetlands Delineation Manual. Technical Report Y-87-1,* U.S. Army Corps of Engineers Waterways Experiment Station, Vicksburg, Mississippi.

Eggeman, E. 2018. *DCID Haul Road Survey.* Memorandum to Brad Henderson, Aquatic Conservation Planning Supervisor. California Department of Fish and Wildlife, Region 1, Redding, California.

Federal Highway Administration. 2012. *HEC-14, Hydraulic Design of Energy Dissipaters for Culverts and Channels-Third Edition.* Publication No. FHWA-NHI-06-086.

Janeway, L. 2013. *Vern Oswald's Selected Plants of Northern California and Adjacent Nevada: Studies from the Herbarium.* California State University, Chico, California.

Jennings, M.R., and M.P. Hayes. 1994. *Amphibian and Reptile Species of Special Concern in California.* California Department of Fish and Game, Inland Fisheries Division, Rancho Cordova, California.

Johnson, J.J. 1992. *Prehistoric Human Remains, Petroglyphs, Structures, and Miscellaneous Features from Northeastern California*. Institute of Archaeology and Cultural Studies, Department of Anthropology, California State University, Sacramento, Chico, California. Number 6. On file, Northeast California Information Center, California Historical Resources Information System, Department of Anthropology, California State University, Chico, California.

Johnson, M. and K. Merrick. 2012. *Juvenile Salmonid Monitoring Using Rotary Screw Traps in Deer Creek and Mill Creek, Tehama County, California Summary Report: 1994- 2010.* California Department of Fish and Game, Red Bluff Field Office Technical Report No. 04-2012.

Mayer, K.E., and W.F. Laudenslayer, Jr., Editors. 1988. *A Guide to Wildlife Habitats of California.* California Department of Forestry and Fire Protection, Sacramento, California.

McEwan, D. and T.A. Jackson. 1996. *Steelhead Restoration and Management Plan for California.* California Department of Fish and Game, Inland Fisheries Division, Sacramento, California.

Moyle, P.B., R.M. Quiñones, J.V. Katz and J. Weaver. 2015. *Fish Species of Special Concern in California, Third Edition.* Prepared for the California Department of Fish and Wildlife, Sacramento, California.

National Marine Fisheries Service. 2000. *Guidelines for Electro fishing Waters Containing Salmonids Listed Under the Endangered Species Act.* Dated June 2000.

National Marine Fisheries Service. 2016. *Programmatic Endangered Species Act (ESA) Section 7(a)(2) Biological Opinion, Magnuson-Stevens Fishery Conservation Act, and Essential Fish Habitat*

Consultation for Mill and Deer Creek Fish Passage Improvement Projects. Consultation Number 151422-WCR2016-SA00224. West Coast Region, Sacramento, California.

National Marine Fisheries Service. 2018. *West Coast Region, California Species List.* URL nmfswcrca.specieslist@noaa.gov. Retrieved August 2018.

Natural Resources Conservation Service. 2018. *Web Soil Survey*. URL http://websoilsurvey.nrcs.usda.gov. Accessed June 2018.

Northwest Hydraulic Consultants. 2017. *Deer Creek DCID Dam Fish Passage Project 100% Basis of Design Report.* Prepared for the U.S. Fish and Wildlife Service, Red Bluff Fish and Wildlife Office, Red Bluff, California.

Remsen, J.V., Jr. 1978. *Bird Species of Special Concern in California: An Annotated List of Declining or Vulnerable Bird Species.* Administrative Report 78-1, California Department of Fish and Game, Wildlife Management Division, Sacramento, California.

Reynolds, F., T.J. Mills, R. Benthin, and A. Low. 1993. *Restoring Central Valley Streams: A Plan for Action.* California Department of Fish and Game, Sacramento, California.

Sacramento River Watershed Program. 2018. URL http://www.sacriver.org/. Accessed June 2018.

Sawyer, J.O., T. Keeler-Wolf and J.M. Evens. 2009. *A Manual of California Vegetation. 2nd Edition.* California Native Plant Society, in collaboration with California Department of Fish and Game, Sacramento, California.

Shuford, W.D., and T. Gardali, editors. 2008. *California Bird Species of Special Concern: A Ranked Assessment of Species, Subspecies, and Distinct Populations of Birds of Immediate Conservation Concern in California. Studies of Western Birds No. 1.* Western Field Ornithologists, Camarillo, California, and California Department of Fish and Game, Sacramento, California.

Soil Conservation Service and Forest Service in cooperation with University of California Agricultural Experiment Station. 1967. *Soil Survey Tehama County California.* U.S. Government Printing Office, Washington D.C.

Stebbins, R.C. 1972. *California Amphibians and Reptiles*. University of California Press, Berkeley, California.

Swainson's Hawk Technical Advisory Committee. 2000. *Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley.* May 31, 2000.

Tehama Environmental Solutions, Inc. 2018. *Biological Resources Evaluation: Deer Creek DCID Dam Fish Passage Project, Tehama County, California.* Prepared for Northwest Hydraulic Consultants, Sacramento, California.

Tehama Environmental Solutions, Inc. 2019a. Revised *Delineation of Waters of the U.S.: Deer Creek DCID Dam Fish Passage Project, Tehama County, California.* Prepared for Northwest Hydraulic Consultants, Sacramento, California.

Tehama Environmental Solutions, Inc. 2019b. Biological Assessment*: Deer Creek DCID Dam Fish Passage Project, Tehama County, California.* Prepared for Northwest Hydraulic Consultants, Sacramento, California.

The Habitat Restoration Group. 1998. *Existing Conditions Report.* Prepared for the Deer Creek Watershed Conservancy, Vina, California.

U.S. Army Corps of Engineers. 2008. *Regional Supplement to the Corps of Engineers Wetlands Delineation Manual: Arid West Region (Version 2.0)*. ERDC/EL TR-08-28. U.S. Army Corps of Engineers, Engineer Research and Development Center, Vicksburg, Mississippi.

U.S. Census Bureau. 2018. *URL http//quickfacts.census.gov. Accessed June, 2018.*

U.S. Department of Labor-Bureau of Labor Statistics. 2018. URL http//data.bls.gov/data. *Accessed June, 2018.*

U.S. Fish and Wildlife Service. 1999. *Draft Finding of No Significant Impact: Anadromous Fish Restoration Actions in Lower Deer Creek, Tehama County, California*. Prepared for the Sacramento-San Joaquin Estuary Fishery Resource Office, Stockton, California.

U.S. Fish and Wildlife Service. 2001. *Final Restoration Plan for the Anadromous Fish Restoration Program: A Plan to Increase Natural Production of Anadromous Fish in the Central Valley of California*. Prepared for the Secretary of the Interior by the United States Fish and Wildlife Service with the assistance from the Anadromous Fish Restoration Program Core Group under authority of the Central Valley Project Improvement Act. January 9, 2001.

U.S. Fish and Wildlife Service. 2005. *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon.* Portland, Oregon.

U.S. Fish and Wildlife Service. 2007. *Vernal Pool Tadpole Shrimp (Lepidurus packardi) 5-Year Review: Summary and Evaluation.* Sacramento, California.

U.S. Fish and Wildlife Service. 2010. *Rising to the Urgent Challenge: Strategic Plan for Responding to Accelerating Climate Change*. September 2010.

U.S. Fish and Wildlife Service. 2017. *Framework for Assessing Impacts to the Valley Elderberry Longhorn Beetle (Desmocerus californicus dimorphus).* Sacramento Fish and Wildlife Office, Sacramento, California.

U.S. Fish and Wildlife Service. 2018a. *List of Threatened and Endangered Species that may Occur in your Proposed Project Location and / or may be Affected by your Proposed Project.* URL www.fws.gov/sacramento/es_species/es_species_lists.cfm. Retrieved December 14, 2018.

U.S. Fish and Wildlife Service. 2018b. *Critical Habitat for Threatened & Endangered Species*. URL https://ecos.fws.gov/ecp/report/table/critical-habitat.html. Accessed July 2018.

U.S. Forest Service. 1999. *Watershed Analysis for Mill, Deer, and Antelope Creeks.* U.S. Department of Agriculture, Lassen National Forest, Almanor Ranger District, Chester, California.

White, G.G. 2003. *Cultural Resource Overview and Management Plan Sacramento River Conservation Area, Tehama, Butte, Glenn, and Colusa Counties, California.* Prepared for The Nature Conservancy. On file, Northeast California Information Center, California Historical Resources Information System, Department of Anthropology, California State University, Chico, California.

White, G.G. and J. Reifschneider-Smith. 2018. *Historical Resource Investigation of the United States Fish and Wildlife Service Deer Creek Irrigation District Deer Creek Diversion Dam Fish Passage Improvement*

Project, Near Vina, Tehama County, California. Prepared for Tehama Environmental Solutions, Inc., Red Bluff, California.

Williams, D.F. 1986. *Mammalian Species of Special Concern in California.* Administrative Report 86-1. California Department of Fish and Game, Wildlife Management Division, Sacramento, California.

Zeiner, D.C., W.F. Laudenslayer, Jr., and K. E. Mayer. 1988. *California's Wildlife, Vol. I Amphibians and Reptiles.* California Department of Fish and Game, Sacramento, California.

Zeiner, D.C., W.F. Laudenslayer, Jr., and K. E. Mayer. 1990a. *California's Wildlife, Vol. II Birds.* California Department of Fish and Game, Sacramento, California.

Zeiner, D.C., W.F. Laudenslayer, Jr., and K. E. Mayer. 1990b. *California's Wildlife, Vol. III Mammals.* California Department of Fish and Game, Sacramento, California.

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Appendix A: 100% Design Plan Drawings
Appendix B: Potentially-occurring Special-status Vascular Plant Species
Appendix C: Vascular Plant Species Observed Within or Near the Project Site
Appendix D: Potentially-occurring Special-status Faunal Species
Appendix E: Faunal Species Observed Within or Near the Project Site
Appendix F: Mitigation Monitoring and Reporting Program
Appendix G: CEQA Environmental Checklist Form
Appendix H: Greenhouse Gas Emissions Inventory
Appendix I: Public Comments