Lassen Lodge Hydroelectric Project

Draft Environmental Impact Report

September 2020

Federal Energy Regulatory Commission (FERC)
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Cardno

Draft Environmental Impact Report for the Lassen Lodge Hydroelectric Project

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Draft Environmental Impact Report for the Lassen Lodge Hydroelectric Project

Pursuant to:

California Environmental Quality Act, Public Resources Code section 21000 et seq. (CEQA); California Code of Regulations, title 14, section 15000 et seq. (CEQA Guidelines)

Lead Agency:
State Water Resources Control Board

The Lassen Lodge Hydroelectric Project Draft Environmental Impact Report is being made available to the public in accordance with the California Environmental Quality Act.

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Table of Contents

Appendices

Tables

Figures

Acronyms

7DADM	7–Day Average Daily Maximum
AADT	Average annual daily traffic
APE	Area of Potential Effect
APLIC	Avian Power Line Interaction Committee
AQMD	Air Quality Management District
ARPA	Archaeological Resources Protection Act
ASCE	American Society of Civil Engineers

BA	Biological Assessment
BCSSRP	Battle Creek Salmon and Steelhead Restoration Project
BLM	Bureau of Land Management
BMI	benthic macroinvertebrates
BMP	best management practices
BSO	Buildings, structures, and objects
CAL FIRE	California Department of Forestry and Fire Protection
CBC	California Building Code
CCC	Civilian Conservation Corps
CDFW	California Department of Fish and Wildlife
CEC	California Energy Commission
CEQ	Council on Environmental Quality
CEQA	California Environmental Quality Act
CESA	California Energy Storage Alliance
CFC	California Fire Code
cfs	Cubic feet per second
CHRIS	California Historical Resources Information System
CNEL	Community Noise Equivalent Level
CPUC	California Public Utilities Commission
CRHR	California Register of Historical Resources
CRLF	California red–legged frogs
CSBP	California Stream Bioassessment Protocol
CVRWQCB	Central Valley Regional Water Quality Control Board
CWA	Clean Water Act
CY	Cubic yards
DMA	Disaster Mitigation Act
DNL	Day–Night Level (or Ldn)
DPS	Distinct population segment
DSMP	Debris and Sediment Management Plan
DTSC	Department of Toxic Substances Control
DTSC	Department of Toxic Substances Control
DWR	Department of Water Resources
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EOP	Emergency Operations Plan

EPA	Environmental Protection Agency
ER	Environmental Report
ESA	Endangered Species Act
ESU	Evolutionarily significant units
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management
FERC	Federal Energy Regulatory Commission
FHA	Federal Highway Administration
FHSZ	Fire Hazard Severity Zone
FHWA	Federal Highway Administration
FIRM	Flood Insurance Rate Map
FLA	Final License Application
FMMP	Farmland Mapping and Monitoring Program
FONSI	Finding of No Significant Impact
FPA	Federal Power Act
FTA	Federal Transit Administration
FYLF	Foothill yellow–legged frogs
GEM	Geologic Energy Management
GLO	General Land Office
GSA	Groundwater Sustainability Agencies
GSP	Groundwater Sustainability Plans
GWMP	Groundwater Management Pan
HDPE	high–density polyethylene
HFTD	High Fire Threat District
HMBP	Hazardous Material Business Plan
HPMP	Historic Properties Management Plan
IDP	Inadvertent Discovery Plan
ITO	Independent Transmission Operators
KVA	Key Viewing Areas
Ldn	Day–Night Level (or DNL)
LESA	Land Evaluation & Site Assessment
LRA	Local Responsibility Area
LUST	Leaking Underground Storage Tank
MIF	Minimum Instream Flow
MJHMP	Multi–Jurisdictional Hazard Mitigation Plan

MLD	Most Likely Descendant
MW	megawatt
MWh	megawatt–hour
NAGPRA	Native American Graves Protection and Repatriation Act
NAHC	Native American Heritage Commission
NEIC	Northeast Information Center
NEPA	National Environmental Policy Act
NFIP	National Flood Insurance Program
NHC	Northwest Hydraulic Consultants
NHPA	National Historic Preservation Act
NIMS	National Incident Management System
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPDES	Nation Pollution Discharge Elimination System
NR	Natural Resources
NRHP	National Register of Historic Places
NTU	Nephelometric turbidity unit
OHP	Office of Historic Preservation
OPR	Office of Planning and Research
OSHA	Occupational Safety and Health Administration
PA	Programmatic Agreement
PAL	Project's Area Limit
PCI	Pavement condition index
PG&E	Pacific Gas and Electric
PHABSIM	physical habitat simulation
PM&E	protect, mitigate, or enhance environmental resources
POI	Point of interconnection
PPV	Peak particle velocity
PRC	Public Resources Code
RCRA	Resource Conservation and Recovery Act
RM	River mile
ROW	Right–of–way
RPS	Renewables Portfolio Standard
RTP	Regional Transportation Plan
RWQCB	Regional Water Quality Control Board

SCHMRT	Shasta Cascade Hazardous Materials Response Team
SDGE	San Diego Gas & Electric
SEMS	Standardized Emergency Management System
SF	Square feet
SFHA	Special Flood Hazard Area
SGMA	Sustainable Groundwater Management Act
SHMA	Seismic Hazards Mapping Act
SHPO	State Historic Preservation Officer
SPI	Sierra Pacific Industries
SRA	State Responsibility Area
State Water Board	State Water Resources Control Board
SWAMP	Surface Water Ambient Monitoring Program
SWPPP	Storm Water Pollution Prevention Plan
TAC	Technical Advisory Committee
TCAPCD	Tehama County Air Pollution Control District
TCFD	Tehama County Fire Department
TCR	Tribal Cultural Resources
TCSO	Tehama County Sheriff's Office
TMDL	Total daily maximum load
TPZ	Timber Production Zone
TRG	Technical Review Group
US	United States
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
VMT	Vehicle miles traveled
WMP	Wildfire Mitigation Plan
WQMP	Water Quality Monitoring and Protection Plans
WSL	Water surface level
WTMP	Water Temperature Monitoring Plan

Executive Summary

Introduction

The State Water Resources Control Board (State Water Board) prepared this Environmental Impact Report (EIR) in response to Rugraw, LLC's (Rugraw) application for a water quality certification for the construction, operation, and maintenance of the Lassen Lodge Hydroelectric Project (Proposed Project) under an original Federal Energy Regulatory Commission (FERC) license. When the State Water Board considers issuing a water quality certification for a project, it evaluates whether the project will comply with applicable water quality standards and other appropriate requirements of state law and determines conditions necessary to protect water quality in California.

The Proposed Project, referenced in FERC documents as Project Number 12496, would be a new hydroelectric project located on the upper South Fork Battle Creek. In accordance with the Federal Power Act (16 U.S.C. section 791 et seq.) and FERC regulations, Rugraw submitted a Final License Application to FERC on April 21, 2014. As part of its review of Rugraw's application, FERC issued its Final Environmental Impact Statement for Hydropower License (Final EIS) in July 2018. Pursuant to section 401 of the federal Clean Water Act (33 U.S.C. section 1341), Rugraw reapplied to the State Water Board for a water quality certification for the Proposed Project on November 14, 2019.

The State Water Board has two separate and distinct responsibilities regarding the Proposed Project: (1) ensuring compliance with water quality standards and other requirements of state law, and (2) complying with the California Environmental Quality Act (CEQA).

CEQA requires a public agency with discretionary authority to issue a certification, permit, or other approval to evaluate the environmental impacts of its action. The State Water Board has the principal responsibility for approving the Proposed Project and is therefore the lead agency under CEQA. (Pub. Resources Code, section 21067; Cal. Code Regs., tit. 14, section 15367.)

The State Water Board has prepared this EIR to conform with CEQA. An EIR is a public document designed to inform the public and governmental agencies of a project's potential environmental effects and foster public participation and informed decision–making. This EIR is a project EIR that focuses on the changes in the environment that would result from the Proposed Project (See CEQA Guidelines, section 15161). As required by CEQA, this EIR discloses significant adverse impacts that may be caused by the Proposed Project and also identifies mitigation measures to reduce the significance of identified impacts. In preparing this EIR, the State Water Board considered FERC's Final EIS as well as Rugraw's final license application and all amendments thereto, recommendations made by the California Department of Fish and Wildlife (CDFW), United States Fish and Wildlife Service (USFWS), and National Marine Fisheries Service (NMFS) pursuant to section 10(j) of the Federal Power Act, and the sediment transport, fish habitat, and water temperature studies completed as part of the FERC licensing process.

Definition of the Proposed Project in this EIR

For the purposes of this EIR and in accordance with CEQA Guidelines[1] section 15378, a "project" is defined as "the whole of an action, which has a potential for resulting in either a direct physical change in the environment, or a reasonably foreseeable indirect physical change in the environment" that is "an activity involving issuance to a person of a lease, permit, license, certificate, or other entitlement for use by one or more public agencies."

For purposes of the environmental analysis contained in this EIR, the Project under consideration is the construction, operation, and maintenance of the Proposed Project, which includes FERC's Final EIS Staff Alternative with two additional measures developed in consultation with NMFS after publication of the Final EIS, as further described in Chapter 2, Proposed Project Description.

Proposed Project Objectives

As required by section 15124, subdivision (b) of the CEQA Guidelines, this EIR identifies project objectives. These objectives are used in evaluating alternatives to determine whether and to what extent the alternatives achieve the intent of a proposed project. In evaluating alternatives, a lead agency must consider both an alternative's consistency with project objectives and its potentially significant impacts.

The underlying purpose of the Proposed Project is to provide hydroelectric power. Three specific objectives related to this purpose, to be accomplished through the Proposed Project, are:

1. **Generate electricity for the term of the original license to produce electric power.** The Proposed Project would generate electricity to help meet California's power requirements. It would produce approximately 5 megawatts (MW) per hour of operation and is expected to produce an average of 24,936 megawatt hours (MWh) per year.
2. **Provide renewable hydropower to help California meet its Renewables Portfolio Standard (RPS).** In 2002, the state of California established its RPS program, which requires that a specific percentage of electricity retail sales must come from renewable energy resources, which include small hydroelectric facilities. The Proposed Project would contribute to California's efforts to meet its RPS requirements by producing 5 MW per hour of operation and an average of 24,936 MWh of renewable energy per year.
3. **Identify and implement measures to avoid or mitigate damage to the environment, including fish and wildlife, and protect beneficial uses of South Fork Battle Creek.** Rugraw will develop and implement several plans and programs to ensure compliance with water quality standards and other appropriate requirements of state law. These plans and programs will address concerns related to fish and wildlife, as well as temperature, turbidity, pH, and other aspects of water

[1] The CEQA Guidelines are found at California Code of Regulations, title 14, sections 15000 et seq.

quality. In addition, the Proposed Project would not affect the planned Battle Creek Salmon and Steelhead Restoration Project.

Overview of the Proposed Project

Rugraw proposes to construct, operate, and maintain a 5–MW capacity hydroelectric project located on the upper South Fork Battle Creek on the western slopes of the Cascade Range in unincorporated Tehama County. The Proposed Project encompasses approximately 250 acres located primarily on private lands. Portions of the transmission line will be located within existing county–owned roadway easements.

Proposed Project facilities include:

- an 8–foot high, 63–foot long diversion dam
- a 17–foot by 25–foot intake structure with fish screen and juvenile fish return pipe on the south streambank
- a buried 7,565–foot long, 48–inch diameter low–pressure pipeline
- a buried 5,230–foot long 36–inch diameter high–pressure penstock
- a 60–by–90–foot powerhouse containing control equipment and a tailwater chamber with a single turbine coupled to a generator
- a fenced 40–by–42–foot substation
- a 12–mile long transmission line with supporting poles and towers
- a fenced 25–by–25–foot switchyard
- two new powerlines/station lines (0.5–miles and 0.1 miles in length) with supporting poles, and
- four multi–purpose areas (ranging from 10,000 square feet to one acre).

The Proposed Project also includes construction of two new gravel base roads branching off existing access roads. Construction would occur over a six–month period between late spring and early fall. In addition, the Proposed Project includes improvements to Sierra Pacific Industries logging roads 100A and 120A7.

The Proposed Project would operate when river flows are between 18 and 418 cubic feet per second (cfs). During operation, the Proposed Project would divert flows in excess of 13 cfs (up to a maximum of 105 cfs) from the South Fork Battle Creek. Diverted water would travel through the intake structure, pipeline and penstock and exit the turbine into the tailwater chamber before being returned to the streambed. During operation, the Proposed Project would reduce streamflow in a portion of the South Fork Battle Creek approximately 2.4 miles long, referred to as the bypass reach. Rugraw has agreed to implement the following Environmental Management and Monitoring Plans developed through consultation with interested parties (refer to *Section 2.3.5, Other Environmental Management and Monitoring Plans* for detailed descriptions):

- Anadromous Fish Monitoring Program

- Noxious Weed Management and Revegetation Plan
- Historic Properties Management Plan and Programmatic Agreement
- Project Operation Compliance Monitoring and Reporting Plan
- Water Temperature Monitoring Plan
- Special–Status Amphibian Protection Plan
- Turbidity and pH Monitoring Plan
- Avian Protection Plan
- Aquatic and Invasive Species Monitoring Plan
- Bald Eagle and Raptor Management Plan
- Debris and Sediment Management Plan
- Erosion Control and Sedimentation

For a complete description of the Proposed Project, please see *Chapter 2, Proposed Project Description*.

Public Involvement and Agency Consultation

The public involvement and scoping processes completed to date are documented in Appendix A, Scoping and Public Involvement.

On November 5, 2014, the State Water Board and FERC held joint scoping meetings in both Sacramento and Red Bluff to solicit public, tribal, and agency input and comments on the Proposed Project and identify key issues that should be addressed in the environmental documents. Four comment letters were received from the Central Valley Water Quality Control Board, NMFS, Pacific Gas & Electric Company (PG&E), and Tehama County (Appendix A–1). PG&E expressed concern that the Proposed Project could affect the operations of their Battle Creek Hydroelectric Project (FERC Number 1121), which is located downstream of the Proposed Project. The Proposed Project would operate in run–of–river mode and would not affect the natural hydrology downstream of the proposed powerhouse tailrace or operation of PG&E's Battle Creek Hydroelectric Project. Therefore, this issue is not listed below (Areas of Known Controversy and Issues to be Resolved) or further addressed in the EIR.

In addition to the joint scoping meetings, the State Water Board issued a Notice of Preparation for the Proposed Project on February 10, 2015 and received comment letters from two residents of Manton, CA and from CDFW (Appendix A–2).

With exception of PG&E's concern regarding their Battle Creek Hydroelectric Project, the issues identified during the public involvement and scoping processes were considered during the development of this EIR. Areas of known controversy and key issues addressed in this EIR are listed below.

Areas of Known Controversy and Issues to be Resolved

Key issues raised during the public involvement and scoping processes include:

- Potential biological resource impacts associated with the Proposed Project to state and federally listed species including resident fish and anadromous salmonids (fish passage), migratory birds, raptors, amphibians, and special–status plants
- Potential exacerbation of existing wildland fire risk due to the Proposed Project
- Potential water quality and temperature impacts in South Fork Battle Creek due to the Proposed Project
- Location of the transmission line route[2]
- Potential impacts of the Proposed Project on the Battle Creek Steelhead and Salmon Restoration Project
- Potential conflicts between the Proposed Project and policies of Tehama County's General Plan related to recreation, riparian zones, fish populations, and aesthetics.

Proposed Project and Alternatives

Chapter 3 of this EIR discusses: (1) CEQA Guidelines related to the development and screening of alternatives; (2) potential alternatives considered but eliminated from further evaluation; and (3) alternatives to be evaluated in detail in the environmental analysis, which include modified measures/conditions proposed by state and/or federal agencies during the FERC licensing process.

Chapter 4, Environmental Analysis, provides a detailed discussion of the environmental impacts of the Proposed Project and project alternatives, as well as alternatives. The analysis of alternatives focuses only on the resource areas potentially affected by the alternative modified measures/conditions, which relate to potentially significant aquatic resources impacts. Refer to *Section 4.6, Biological Resources – Aquatics and Fisheries*.

Chapter 5, Alternatives Summary, provides a summary of the alternatives analysis and identifies the Environmentally Superior Alternative as the No Project Alternative. In accordance with CEQA Guidelines section 15126.6, subdivision (e)(2), Chapter 5 identifies the Environmentally Superior Alternative among the other alternatives as Alternative 2.

The alternatives evaluated in this EIR include:

- **Proposed Project:** Rugraw proposes to operate the Proposed Project in a run–of–river mode. The Proposed Project would release a minimum flow of 13 cfs to the bypass reach. As the powerhouse requires a minimum of 5 cfs to operate, when river inflows are less than 18 cfs (13 cfs for the minimum flow plus 5 cfs required for turbine operation) the Proposed Project would not operate. When inflow is less than 18 cfs, the pneumatic gates would lower and inflow would remain in the channel. When inflow is greater than 18 cfs, flows greater than 13 cfs would be diverted for generation, up to the turbine's maximum hydraulic capacity of 105 cfs. Streamflows greater than the combined hydraulic capacity of the turbine and the proposed minimum flow of 13 cfs would

[2] A potential conflict was noted between the alignment of the originally proposed transmission line route and existing land uses. Rugraw subsequently revised the alignment of the transmission line to address this comment. The revised alignment is part of the Proposed Project.

proceed unimpeded through the bottom sluice gates in the diversion dam and, when the capacity of those gates are exceeded, the pneumatic gates would be lowered allowing additional flow to enter the bypass reach. Diverted water would travel through the intake structure, pipeline and penstock and exit the turbine into the tailwater chamber before being returned to the streambed. The bottom sluice gates, pneumatic gates, and turbine nozzles would be operated dynamically and automatically to maintain the MIF, ramping rates, and the diversion pool elevation.

- **No Project Alternative**: Under CEQA, the No Project Alternative is what would reasonably be expected to occur in the foreseeable future, based on current plans and consistent with available infrastructure and community services, if the Proposed Project was not approved and implemented.
- **Alternative 1 – Minimum Instream Flow**: Alternative 1 requires a minimum instream flow (MIF) of 25 to 35 cfs year–round compared to the Proposed Project's MIF of 13 cfs year–round.

  In its Final EIS, FERC (2018b) analyzed a range of minimum flows (i.e., 13 to 35 cfs) using habitat data from Cramer and Ceder (2013) and the USFWS (2016) PHABSIM. Based on this analysis, FERC Staff recommended a MIF of 13 cfs. The recommendation was based on various considerations, but in particular, that natural (unimpaired) flow in the bypass reach is often much lower than 13 cfs and is likely the limiting factor for the current resident rainbow trout (*Oncorhynchus mykiss)* fishery. Similarly, CDFW (2016) concurred with Rugraw's 13 cfs MIF proposal for the current situation where anadromous fish are not present in the bypass reach due to downstream barriers.

  However, an expanded analysis of MIFs is warranted. Thus, the analysis for Alternative 1 incorporates: (1) the latest available Proposed Project hydrology data; (2) the latest available flow versus habitat data from Cramer et al. (2015); and (3) a re–analysis of the USFWS/NMFS PHABSIM data. Further, the habitat versus flow relationships should be incorporated into a habitat time series analysis over the available hydrological period of record to determine the appropriate MIF condition. This alternative analysis explicitly addresses MIFs under two conditions: the condition where only resident species (e.g., *O. mykiss*) occur in the bypass reach and if, in the future, the condition where downstream barriers are removed and ESA–listed salmonids successfully migrate into the bypass reach.
- **Alternative 2 – Ramping Rates**: The previously analyzed and recommended ramping rates (i.e., 0.1 ft per hour from FERC and CDFW and 1.0 inch per hour from NMFS) (FERC, 2018b; CDFW, 2016; NMFS, 2016) do not distinguish between down ramping and up ramping rates, do not distinguish between Proposed Project–induced and natural ramping rates, and do not analyze ramping in relation to protection of foothill yellow–legged frog egg masses/young tadpoles or fish redds. Therefore, Alternative 2 analyzes the following: (1) a 1.0 inch per hour up ramping rate year–round; (2) a 1.0 inch per hour down ramping rate from August 1 through April 30 to evaluate potential Project–induced fish stranding for fry, and (3) a 4.0 inches over 20 days down ramping rate from May 1 through July 31 to evaluate potential foothill yellow–legged frog egg mass/tadpole dewatering.

- **Alternative 3 – Temperature Project Shutdown Thresholds**: FERC's Final EIS analyzed the various alternatives proposed by the resource agencies and presented the Staff Alternative that is currently included in the Proposed Project. However, the analysis only covered the bypass reach and did not specifically address the tailrace reach downstream of the powerhouse to Panther Grade. In addition, the analysis did not specifically address a potential future condition where ESA–listed salmonids access the bypass reach. The analysis did not include a biological rationale regarding the use of an average daily temperature criteria versus a 7–Day Average Daily Maximum (7DADM) criteria as is used in EPA (2003) to protect salmonid life stages.

  Alternative 3 further evaluates the appropriate Proposed Project temperature shutdown criteria to protect aquatic species and lifestages during various seasons, and incorporates into those criteria a mechanism that allows empirical data to be used to determine if the Proposed Project is cooling water temperature in the reaches (beneficial effect; no Proposed Project shutdown) and/or warming water temperature in the reaches (negative effect; Proposed Project shutdown). Alternative 3 explicitly evaluates Proposed Project–induced temperature effects in both the bypass reach and in the tailrace reach downstream of the powerhouse in the context of: (1) the existing conditions where only resident salmonid species (e.g., *O. mykiss*) are present in the bypass reach, and (2) the potential future condition where ESA–listed salmonids access the bypass reach.

Summary of Proposed Project Impacts and Mitigation Measures

A detailed analysis of the potential environmental impacts associated with the Proposed Project, including supporting data and mitigation measures if necessary, can be found in *Chapter 4, Environmental Analysis*, of this EIR.

Table ES–1 summarizes the potential impacts examined in this EIR. For each potential impact, it lists the significance of the potential impact for the Proposed Project. The table also summarizes mitigation measures that could reduce the severity of potentially significant impacts. All mitigation measures, including recommended measures, will be included in the Mitigation, Monitoring, and Reporting Program (MMRP).

Table 5–1 provides a summary of the impacts of the alternatives (No Project and Alternatives 1, 2, and 3) compared to the Proposed Project (see Section 5.1). This EIR identifies potentially significant impacts for the following resources:

- Aesthetics
- Air Quality
- Aquatic Biological Resources
- Terrestrial Biological Resources
- Energy
- Greenhouse Gas Emissions
- Hazards and Hazardous Materials
- Hydrology and Water Quality
- Noise

- Wildfire

These potential effects are discussed in each resource area in Chapter 4. As part of the environmental impact assessment for each resource area, mitigation measures have been identified that reduce these impacts to less–than–significant levels, with the exception of aesthetics, aquatic biological resources, terrestrial biological resources, and hydrology and water quality, which remain significant and unavoidable even with mitigation measures as discussed below.

Significant and Unavoidable Impacts

The EIR identifies impacts to aesthetics as significant and unavoidable. The Proposed Project includes construction of 12 miles of transmission line, two miles of which would be located on Hazen Road and South Powerhouse Road. Rugraw designed the transmission line route to minimize visibility of the transmission line near residences. Existing trees and vegetation would also obscure views of the transmission line. However, since the transmission line would be a permanent structure, and would still be highly visible to residences on Hazen Road and South Powerhouse Road, the transmission line would result in a significant and unavoidable impact to aesthetics.

In addition, the EIR identifies significant and unavoidable impacts to aquatic biological resources (*Section 4.6.6*), terrestrial biological resources (*Section 4.7.4*), and hydrology and water quality (*Section 4.13.6*). In these areas, the EIR also identifies recommended measures that, if implemented, would reduce impacts to less than significant. However, as Rugraw has not affirmatively indicated it would implement the recommended measures, impacts are identified as significant and unavoidable.

Cumulative Impacts

Cumulative impacts of the Proposed Project and Alternatives 1, 2, and 3 with other past, present, and reasonably foreseeable future projects in the geographic area of the Proposed Project were also evaluated. The temporal scope is 30 to 50 years into the future, which reflects the potential term of an initial FERC license. No significant cumulative impacts are anticipated to result from the Proposed Project or the alternatives. *Chapter 6, Cumulative Impacts*, provides a detailed discussion of the cumulative effects of the Proposed Project.

Growth Inducing Impacts

Implementation of the Proposed Project or any of the alternatives would not induce growth in the geographic area. Section 7.3 of this EIR discusses growth–inducing impacts.

Table ES–1. Summary of Proposed Project Impacts and Mitigation Measures

Environmental Resource	Significance Before Mitigation	Mitigation Measure	Significance After Mitigation
4.3 Aesthetics			
IMPACT 4.3–1: Would the project have a substantial adverse effect on a scenic vista?	NI	None Required	NI
IMPACT 4.3–2: Would the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	LTS	None Required	LTS
IMPACT 4.3–3: Would the Proposed Project substantially degrade the existing visual character or quality of public views of the site and its surroundings?	S	None Available	SU
IMPACT 4.3–4: Would the project create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	LTS	None Required	LTS
4.4 Agricultural and Forest Resources			
IMPACT 4.4–1: Would the project 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?	NI	None Required	NI
IMPACT 4.4–2: Would the project conflict with existing zoning for agricultural use, or a Williamson Act contract?	LTS	None Required	LTS

Environmental Resource	Significance Before Mitigation	Mitigation Measure	Significance After Mitigation
IMPACT 4.4–3: Would the project 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))?	LTS	None Required	LTS
IMPACT 4.4–4: Would the project result in the loss of forest land or conversion of forest land to non–forest use?	LTS	None Required	LTS
IMPACT 4.4–5: Would the project 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?	NI	None Required	NI
4.5 Air Quality			
IMPACT 4.5–1: Would the project conflict with or obstruct implementation of the Northern Sacramento Valley Planning Area 2018 Triennial Air Quality Attainment Plan?	LTS	None Required	LTS
IMPACT 4.5–2: Would the project result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non–attainment under an applicable federal or state ambient air quality standard?	S	**Mitigation Measure AIR–1:** Compliance with TCAPCDs GAAQI. As prescribed in TCAPCDs GAAQI, Sections 6.2 and 6.3, the following measures shall be implemented during Proposed Project construction to reduce criteria pollutant emissions. • Fugitive PM_{10} Measures **Land Clearing/Earth Moving:** – Water shall be applied by means of truck(s), hoses and/or sprinklers as needed prior to any	LTS

Environmental Resource	Significance Before Mitigation	Mitigation Measure	Significance After Mitigation
		land clearing or earth movement to minimize dust emission. – Haul vehicles transporting soil into or out of the property shall be covered. – Water shall be applied to disturbed areas a minimum of 2 times per day or more as necessary. – On–site vehicles shall be limited to a speed that minimizes dust emissions on unpaved roads. – A publicly visible sign shall be posted with the telephone number and person to contact regarding dust complaints. This person shall ensure corrective action is taken within 24 hours. The telephone number of the District shall also be visible to ensure compliance with District Rule 4:1 and 4:24 (Nuisance and Fugitive Dust Emissions). **Visibly Dry Disturbed Soil Surface Areas:** – All visibly dry disturbed soil surface areas of operation shall be treated with a dust palliative agent and/or watered to minimize dust emission. **Paved Road Track–Out:** – Existing roads and streets adjacent to the project will be cleaned at least once per day unless conditions warrant a greater frequency. **Visibly Dry Disturbed Unpaved Roads:** – All visibly dry disturbed unpaved roads surface areas of operation shall be watered to minimize dust emission. – Unpaved roads may be graveled to reduce dust emissions. – Water shall be applied to disturbed areas a minimum of 2 times per day or more as necessary.	

Environmental Resource	Significance Before Mitigation	Mitigation Measure	Significance After Mitigation
		– On–site vehicles shall be limited to a speed that minimizes dust emissions on unpaved roads. – Haul roads shall be sprayed down at the end of the work shift to form a thin crust. This application of water shall be in addition to the minimum rate of application. **Vehicles Entering/Exiting Construction Area:** – Vehicles entering or exiting construction area shall travel at a speed that minimizes dust emissions. **Employee Vehicles:** – Construction workers shall park in designated parking areas(s) to help reduce dust emissions. **Soil Piles:** – Soil pile surfaces shall be moistened if dust is being emitted from the pile(s). Adequately secured tarps, plastic or other material may be required to further reduce dust emissions. • Measures for Construction Equipment – Maintain all construction equipment in proper tune according to manufacturer's specifications. – Maximize, to the extent feasible, the use of diesel construction equipment meeting current CARB certification standards for off–road heavy–duty diesel engines. – Registration in CARB's DOORS program (www.arb.ca.gov) and meeting all applicable standards for replacement and/or retrofit. – All portable equipment, including generators and air compressors rated over 50 brake horse power, registered in the PERP (www.arb.ca.gov), or permitted through the District as a stationary source.	

Environmental Resource	Significance Before Mitigation	Mitigation Measure	Significance After Mitigation
		– Electrify equipment where feasible. – Substitute gasoline–powered for diesel–powered equipment, where feasible. – Use alternatively fueled construction equipment on site where feasible, such as compressed natural gas (CNG), liquefied natural gas (LNG), propane, or biodiesel. – Use equipment that has Caterpillar pre–chamber diesel engines.	
IMPACT 4.5–3: Would the project expose sensitive receptors to substantial pollutant concentrations?	S	**Mitigation Measure AIR–1**	LTS
IMPACT 4.5–4: Would the project result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?	LTS	None Required	LTS
4.6 Biological Resources – Aquatic			
IMPACT 4.6–1: Would the Proposed Project 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 or USFWS?	S	**Recommended Measure AQU–1:** Water Quality Monitoring and Compliance. The following mitigation measures would be included in the Proposed Project Turbidity and pH Monitoring Plan: • Monitoring of turbidity, suspended sediment, settleable material, pH, and dissolved oxygen during construction; • Compliance with the Central Valley Basin Plan (CVRWQCB, 2018) water quality criteria for turbidity, suspended sediment, settleable material, pH and dissolved oxygen during construction; • Stop–work conditions and remedial approaches for water quality non–compliance; and • Reporting of construction water quality monitoring results to CDFW and State Water Board	SU

Environmental Resource	Significance Before Mitigation	Mitigation Measure	Significance After Mitigation
		Recommended Measure AQU–2: Stage Recording. Proposed Project compliance stage monitoring/recording by Rugraw downstream of the diversion dam from May 1 to July 31, must either be located in a cross–section that represents the depositional areas where foothill yellow–legged frog deposit egg masses or in a narrower cross–section (more sensitive to flow changes) that would be protective (potentially overprotective) of stage changes in foothill yellow–legged frog breeding habitat. The stage monitoring location must be approved by Agencies responsible for foothill yellow–legged frog management (CDFW, USFWS) **Recommended Measure AQU–3:** Anadromous Fish Monitoring Plan – Instream Flow Study. The Anadromous Fish Monitoring Plan would include an additional instream flow study in the event fish are observed in the bypass reach that (1) covers the full range of hydrology, (2) addresses habitat related to fish density/carrying capacity, (3) uses accurate fry / juvenile rearing and adult spawning habitat suitability criteria. After the study is completed, Rugraw would consult with the agencies (CDFW, NMFS, State Water Board) to determine whether revisions to the minimum instream flow are necessary. **Recommended Measure AQU–4:** Debris and Sediment Management Plan Modifications. Modification of the DSMP is required to include explicit compliance with Basin Plan turbidity standards and monitoring / reporting of turbidity when the pneumatic gates are lowered below half elevation and flows are less than 418 cfs. **Recommended Measure AQU–5:** Anadromous Fish Monitoring Plan – Fish Passage Study. The Anadromous Fish Monitoring Plan would include a fish passage study in the event fish are observed in the bypass reach to identify the flow range that provides adult upstream passage over the potential barriers in the bypass reach (Cramer et al. 2015; Impact 4.6–2 Fish Passage Barriers) and an analysis of the pulse flow amount, timing, and duration needed to assist	

Environmental Resource	Significance Before Mitigation	Mitigation Measure	Significance After Mitigation
		juvenile fish out–migration. After the study is completed, Rugraw would consult with the agencies (CDFW, USFWS, SWRCB, and NMFS) to determine whether the pulse flow should be modified to reduce impacts to anadromous fish passage.	
IMPACT 4.6–2: Would the Proposed Project interfere substantially with the movement of any native resident or migratory wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	S	**Recommended Measure AQU–4**	SU
IMPACT 4.6–3: Would the project conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	LTS	None Required	LTS
IMPACT 4.6–4: Would the Proposed Project conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state Habitat Conservation Plans?	LTS	None Required	LTS
4.7 Biological Resources – Terrestrial			
IMPACT 4.7–1: Would the Proposed Project 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 or USFWS?	S	**Recommended Measure BIO–1:** Protection of Special–Status and Listed Plants during Construction or Routine Vegetation Management Activities. Rugraw would revise the Noxious Weed Management and Revegetation Plan to include the following: • **Coleman's rein orchid:** A qualified biologist would flag the known population of Coleman's rein orchid. No ground disturbing activities would occur within 50 feet of the known population of Coleman's rein orchid during construction of the Proposed Project transmission line.	SU

Environmental Resource	Significance Before Mitigation	Mitigation Measure	Significance After Mitigation
		• **Other special–status plants:** A qualified biologist would conduct targeted surveys for special–status and listed plants potentially occurring in the areas to be cleared of vegetation as part of routine vegetation management over the term of the license. • If special–status or listed plants are documented, Rugraw would develop and implement appropriate avoidance and protection measures considering the species affected and site–specific conditions. Such measures may include, but are not limited to, flagging and avoiding the individuals, or timing vegetation management activities to occur outside the blooming period of the plants (for annual species). • The results of the pre–clearance surveys, and proposed avoidance and protection measures, would be documented in a brief memo and provided to CDFW and USFWS at least seven days prior to implementation of vegetation management. **Recommended Measure BIO–2:** Minimize the Potential for Introduction and Spread of Noxious Weeds during Ongoing Operations and Maintenance. Rugraw would revise the Noxious Weed Management and Revegetation Plan to state that the following measures would be implemented for the license term: • Limiting ground–disturbing activities and vegetation clearing to the smallest footprint possible, while allowing for safe construction of the Project. • Preserving vegetation in place to the extent possible. • Thoroughly cleaning all construction equipment and clothing before entering the Project area to reasonably ensure that seeds and propagules of noxious weeds are not introduced. • Using certified weed–free straw, hay, and mulch for all construction, erosion control, and restoration needs.	

Environmental Resource	Significance Before Mitigation	Mitigation Measure	Significance After Mitigation
		• Restricting travel to established roads and avoid entering areas with existing populations of noxious weeds when possible. Conduct work in un–infested areas first whenever possible. Clean equipment that has been used in weed–infested areas before moving to other areas. **Recommended Measure BIO–3:** Protection of Active Bird Nests. Rugraw would include the following measure in its Avian Protection Plan: • Vegetation removal (i.e., tree or shrub removal, tree limb removal, and brush mastication) would be conducted between September 1 and February 14 to avoid the general nesting bird season. • If this is not possible, a qualified biologist would conduct a pre–activity survey for active bird nests within the area proposed for vegetation removal, non–routine maintenance, or construction activity, plus a 300–foot (raptors) and 50–foot (non–raptors) survey area, within 2 weeks of commencement of the activities. • If active bird nests are found within the survey area, a qualified biologist would determine an appropriate no–work buffer, based on site–specific conditions, including observations of the nesting birds' behavior and sensitivity to human activity; proximity to existing human activity or development (e.g., roads, structures); current site conditions (e.g., screening vegetation, terrain); and site–specific, work–related activities. • Excepting emergencies, no activities would be allowed within the buffer until the biologist has determined that the young have fledged and are no longer occupying the nest, or the nesting attempt has failed.	

Environmental Resource	Significance Before Mitigation	Mitigation Measure	Significance After Mitigation
IMPACT 4.7–2: Would the Proposed Project 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 U.S. Fish and Wildlife Service?	S	**Recommended Measure BIO–4:** Protection of Sensitive Habitats. Rugraw will include the following measure in its Construction Plan (General Construction Measure 1): • Rugraw would obtain all required permits, as appropriate, for work within Waters of the U.S. and State of California, including a Clean Water Act Section 404 permit from the U.S. Army Corps of Engineers; and a Lake/Streambed Alteration Agreement from CDFW. • All conditions of the permits, including mitigation requirements for losses of sensitive habitats including wetlands, riparian habitats, and, if applicable, oak woodland habitats, would be required to be implemented as part of the Proposed Project.	SU
IMPACT 4.7–3: Would the Proposed Project interfere substantially with the movement of any native resident or migratory wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	LTS	None Required	LTS
IMPACT 4.7–4 Would the Proposed Project conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	S	**Recommended Measure BIO–4**	SU
IMPACT 4.7–5: Would the Proposed Project conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state Habitat Conservation Plans?	NI	None Required	NI

Environmental Resource	Significance Before Mitigation	Mitigation Measure	Significance After Mitigation
4.8 Cultural Resources			
IMPACT 4.8–1: Would the action cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5?	LTS	None Required	LTS
IMPACT 4.8–2: Would the action cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5?	LTS	None Required	LTS
IMPACT 4.8–3: Would the action disturb any human remains, including those interred outside of dedicated cemeteries?	LTS	None Required	LTS
4.8 Energy			
IMPACT 4.9–1: Would the project result in potentially significant environmental impact due to wasteful, inefficient, unnecessary consumption of energy resources during project construction or operation?	LTS	None Required	LTS
IMPACT 4.9–2: Would the project conflict with or obstruct a State or local plan for renewable energy or energy efficiency?	S	**Mitigation Measure AIR–1**	LTS
4.10 Geology and Soils			
IMPACT 4.10–1: 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	NI	None Required	NI

Environmental Resource	Significance Before Mitigation	Mitigation Measure	Significance After Mitigation
area or based on other substantial evidence of a known fault?			
ii. Strong seismic ground shaking?	LTS	None Required	LTS
iii. Seismic–related ground failure, including liquefaction?	LTS	None Required	LTS
iv. Landslides?	NI	None Required	NI
IMPACT 4.10–2: Result in substantial soil erosion or the loss of topsoil?	LTS	None Required	LTS
IMPACT 4.10–3: 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?	LTS	None Required	LTS
IMPACT 4.10–4: 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?	LTS	None Required	LTS
IMPACT 4.10–5: 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?	NI	None Required	NI
IMPACT 4.10–6: Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	LTS	None Required	LTS
4.11 Greenhouse Gas Emissions			
IMPACT 4.11–1: Would the project generate greenhouse gas emissions, either directly or indirectly, that would conflict with the implementation of AB32?	LTS	None Required	LTS

Environmental Resource	Significance Before Mitigation	Mitigation Measure	Significance After Mitigation
IMPACT 4.11–2: Would the project conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	S	**Mitigation Measure GHG–1:** Compliance with CARB Regulation for Reducing Sulfur Hexafluoride Emissions from Gas Insulated Switchgear. If it is determined that Gas Insulated Switchgear is required for the Proposed Project, and is not exempt from the SF_6 Regulation (Title 17 of the California Code of Regulations, sections 95350 et seq.), Rugraw shall comply with the requirements of this regulation. This includes reporting annually to CARB that use of the equipment does not exceed the maximum allowable rate of 1 percent.	LTS
4.12 Hazards and Hazardous Materials			
IMPACT 4.12–1: Would the project create substantial exposure to hazardous materials, where substantial is defined as quantities of hazardous, or acutely hazardous, materials that would be harmful to the public or the environment?	LTS	None Required	LTS
IMPACT 4.12–2: Would the project emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one–quarter mile of an existing or proposed school?	NI	None Required	NI
IMPACT 4.12–3: Would the project 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 it create a significant hazard to the public or the environment?	NI	None Required	NI
IMPACT 4.12–4: 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, would the project result in a safety hazard or excessive	LTS	None Required	LTS

Environmental Resource	Significance Before Mitigation	Mitigation Measure	Significance After Mitigation
noise for people residing or working in the project area?			
IMPACT 4.12–5: Would the project impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	S	**Mitigation Measure FIRE–1**	LTS
IMPACT 4.12–6: Would the project expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires?	S	**Mitigation Measure FIRE–1**	LTS
4.13 Hydrology and Water Quality			
IMPACT 4.13–1: Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality?	S	**Recommended Measure WQ–1 (same as AQ–1):** Water Quality Monitoring and Compliance **Recommended Measure WQ–2:** Water Quality and Hazardous Material Training. Annually, including prior to Proposed Project implementation, all contractor and subcontractor personnel would receive training regarding the appropriate work practices necessary to effectively comply with the applicable environmental laws and regulations, including, water quality compliance and hazardous materials spill prevention and response measures. **Recommended Measure WQ–3:** Hazardous Material Business Plan. A Hazardous Materials Business Plan would be prepared and implemented. The plan would: ▪ Identify all hazardous materials, including Portland cement concrete. ▪ Identify spill response materials. ▪ Specify procedures for notification and reporting, including internal management and local agencies (e.g., fire department, Department of Environmental Health), as needed. ▪ Specify measures to manage and remediate waste, as needed.	SU

Environmental Resource	Significance Before Mitigation	Mitigation Measure	Significance After Mitigation
		Recommended Measure WQ–4: Spill Prevention and Countermeasure Plan. A Spill Prevention Control and Countermeasure Plan would be prepared and implemented. The plan would: ▪ Prevent fuel from being stored in or near a floodplain. ▪ Identify fuel storage areas that will prevent spill from being routed off site into waterways. ▪ Identify measures to limit and control fuel spills, including use of bermed storage areas, equipment inspections, fueling and refueling procedures. ▪ Describe the use and placement of spill kits. ▪ Specify reporting requirements in the event of a spill. **Recommended Measure WQ–5:** Material Disposal Measure. Hazardous materials or other materials that can affect water quality would not be disposed of or released onto the ground, the underlying groundwater, or any surface water. Totally enclosed containment would be provided for all trash. All construction and maintenance waste, including trash and litter, garbage, other solid waste, petroleum products, and other potentially hazardous materials (including equipment lubricants, solvents, and cleaners), would be removed to an appropriate waste facility permitted or otherwise authorized to treat, store, or dispose of such materials. **Recommended Measure WQ–6:** Hazardous Material Spill Kits. Hazardous materials spill kits would be maintained onsite and in vehicles for small spills. These kits would include oil–absorbent material and tarps to contain and control any minor releases. During Proposed Project activities, emergency spill supplies and equipment would be kept adjacent to all areas of work and in staging areas and would be clearly marked. Detailed information for responding to accidental spills and for handling any resulting hazardous materials would be provided in the Spill Prevention Control and Countermeasure Plan.	

Environmental Resource	Significance Before Mitigation	Mitigation Measure	Significance After Mitigation
		Recommended Measure WQ–7: SWPPP BMPs. The SWPPP would specify the location, type, and maintenance requirements for best management practices (BMPs) necessary to prevent stormwater runoff from carrying construction–related pollutants that currently are not identified in Rugraw's SWPPP or Erosion Control and Sedimentation Plan. BMPs would be implemented to address potential release of fuels, oil, and/or lubricants from operational vehicles and equipment (e.g., drip pans, secondary containment, washing stations), as well as release of fine sediment from material stockpiles (e.g., sediment barriers, soil binders). The SWPPP would be developed and implemented by a Construction General Permit Qualified SWPPP Practitioner/ Qualified SWPPP Developer and submitted to the RWQCB as part of obtaining regulatory approval for the proposed activities (i.e., the Industrial General Permit). **Recommended Measure WQ–8:** Operational Erosion and Sedimentation Control**.** The Erosion Control and Sedimentation Plan would include annual reporting and BMPs to address control of erosion and sedimentation related to Proposed Project access roads, work areas, and facilities. The plan, including appropriate BMPs, would be developed in collaboration with the State Water Board and CDFW. Annually Rugraw would report any Proposed Project related erosion or sedimentation issues and remedial actions to address the erosion or sedimentation to the State Water Board and CDFW. **Recommended Measure WQ–9:** Pesticide and Herbicide Use. A measure would be developed in collaboration with the State Water Board and CDFW to identify and implement pesticide and herbicide BMPs to protect surface water in the vicinity of the Proposed Project during operations and maintenance activities. At a minimum the BMPs would include allowable pesticide/herbicides, buffer areas near surface water, and application methods.	

Environmental Resource	Significance Before Mitigation	Mitigation Measure	Significance After Mitigation
IMPACT 4.13–2: Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?	LTS	None Required	LTS
IMPACT 4.13–3: Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:	—	—	—
i. Result in substantial on– or offsite erosion or siltation?	S	**Recommended Measure WQ–8**	SU
ii. Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on or offsite?	LTS	None Required	LTS
iii. 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?	S	**Recommended Measures WQ–1 through WQ–8**	SU
iv. Impede or redirect flood flows?	LTS	None Required	—
IMPACT 4.13–4: In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?	S	**Recommended Measures WQ–2 through WQ–7**	SU
IMPACT 4.13–5: Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?	S	**Recommended Measures WQ–1 through WQ–9**	SU

Environmental Resource	Significance Before Mitigation	Mitigation Measure	Significance After Mitigation
4.14 Land Use and Planning			
IMPACT 4.14–1: Would the project physically divide an established community?	LTS	None required	—
IMPACT 4.14–2: Would the project conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect in a manner that would prevent the avoidance or mitigation result sought to be achieved by the plan, policy, or regulation?	LTS	None required	—
4.15 Noise			
IMPACT 4.15–1: Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or in other applicable local, state, or federal standards?	S	**Mitigation Measures:** The following mitigation measures shall be applied to areas where construction takes place within 500 feet of nearby residences to minimize construction–related noise. This includes near Rolling Hills Road, Hazen Road, and South Powerhouse Road. • **NOISE–1**: Implement General Noise Protection and Reduction Measures. All noise producing equipment shall be equipped with noise control devices such as mufflers, in accordance with manufacturers' specifications and shall be maintained in proper operating condition. Equipment not in use shall not be left idling for more than five minutes. • **NOISE–2:** Limit Period of Construction. Proposed Project construction shall occur between the hours of 7 AM to 7 PM, Monday through Friday, with the exception of holidays (or otherwise established by Tehama County) when construction activities occur within 500 feet of residences.	LTS

Environmental Resource	Significance Before Mitigation	Mitigation Measure	Significance After Mitigation
		• **NOISE–3:** Coordinate with Adjacent Residences. At least one week prior to commencement of construction activities near residences, Rugraw's contractor shall provide written notification to adjacent residences identifying the type, duration, and frequency of construction operations. Notification materials shall also identify a mechanism for residents to register noise–related complaints with Tehama County, which generally considers noise–related concerns on a case–by–case basis.	
IMPACT 4.15–2: Generation of excessive groundborne vibration or groundborne noise levels?	LTS	None Required	LTS
IMPACT 4.15–3: For a project located within the vicinity of a private airstrip or 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, would the project expose people residing or working in the project area to excessive noise levels?	NI	None Required	NI
4.16 Recreation			
IMPACT 4.16–1: 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?	LTS	None Required	LTS
IMPACT 4.16–2: Include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment?	LTS	None Required	LTS

Environmental Resource	Significance Before Mitigation	Mitigation Measure	Significance After Mitigation
4.17 Transportation and Traffic			
IMPACT 4.17–1: Conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities?	LTS	None Required	LTS
IMPACT 4.17–2: Conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b)?	LTS	None Required	LTS
IMPACT 4.17–3: Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	LTS	None Required	LTS
IMPACT 4.17–4: Result in inadequate emergency access?	LTS	None Required	LTS
4.18 Tribal Cultural Resources			
IMPACT 4.18–1: Would the Proposed 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)	LTS	None Required	LTS
ii. A resource determined by the lead agency, in its discretion and supported	LTS	None Required	LTS

Environmental Resource	Significance Before Mitigation	Mitigation Measure	Significance After Mitigation
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.			
4.19 Wildfire			
IMPACT 4.19–1: Substantially impair an adopted emergency response plan or emergency evacuation plan?	S	**Mitigation Measure FIRE–1: Wildfire Mitigation Plan** 1a. To minimize the risk of wildfire, prior to Proposed Project construction, Rugraw shall submit a Wildfire Mitigation Plan (WMP) in compliance with SB 901 legislation and with direction from the CPUC (Rulemaking 18–10–007 updated December16, 2019, as clarified December 23, 2019). 1b. The WMP shall be reviewed and approved by the CPUC and CAL FIRE. 1c. The WMP shall include the following, unless directed otherwise by the CPUC and CAL FIRE: • Persons responsible for executing the plan; • Metrics and underlying data; • Baseline ignition probability and wildfire risk exposure; • Inputs to the plan, including current and directional vision for wildfire risk exposure; and • Wildfire mitigation activity for each year of the 3–year WMP term, including expected outcomes of the 3–year plan. The objectives of the WMP shall, at a minimum, be consistent with the requirements of Public Utilities Code section 8386, subdivision (a). This includes a description	LTS

Environmental Resource	Significance Before Mitigation	Mitigation Measure	Significance After Mitigation
		of utility WMP objectives, categorized by each of the following timeframes: • Before the upcoming wildfire season, as defined by CAL FIRE; • Before the next annual update; • Within the next 3 years; and • Within the next 10 years. The WMP shall also specifically address the use of South Fork Battle Creek as a source of water for suppression activities.	
IMPACT 4.19–2: Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?	S	**Mitigation Measure FIRE–1**	LTS
IMPACT 4.19–3: Require the installation of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?	S	**Mitigation Measure FIRE–1**	LTS
IMPACT 4.19–4: Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post–fire slope instability, or drainage changes?	S	**Mitigation Measure FIRE–1**	LTS

Notes: LTS = Less than Significant
NI = No Impact
S = Significant Impact
SU = Significant and Unavoidable Impact

Chapter 1 Introduction

The State Water Resources Control Board (State Water Board) prepared this Environmental Impact Report (EIR) in response to Rugraw, LLC's (Rugraw) application for a water quality certification for the construction, operation, and maintenance of the Lassen Lodge Hydroelectric Project (Proposed Project) under an original Federal Energy Regulatory Commission (FERC) license. This chapter provides background information on the Proposed Project and water quality certification (certification) process, as well as the California Environmental Quality Act (CEQA) process.

1.1 Background

On November 14, 2019, Rugraw resubmitted an application for a Clean Water Act (CWA) section 401 water quality certification (certification) to the State Water Board in support of its application for an original FERC license for the proposed Lassen Lodge Hydroelectric Project, identified by FERC as Project Number 12496 (Rugraw, 2018). Rugraw proposes to construct, operate, and maintain a 5 –megawatt (MW) capacity hydroelectric project located on the upper South Fork Battle Creek on the western slopes of the Cascade Range, approximately 1.5 miles west of the town of Mineral in unincorporated Tehama County. The Proposed Project encompasses approximately 250 acres located primarily on private lands, with some areas located within existing county–owned roadway easements (Figure 1–1).

Rugraw originally submitted an application for certification on May 20, 2014 (Rugraw, 2014). Following its initial 2014 filing, Rugraw continued to amend its application, conduct environmental resource studies, develop environmental management and monitoring plans, and revise its project description. The most recent certification application was submitted on November 14, 2019.

1.2 Water Quality Certification

Section 401 of the federal Clean Water Act requires applicants for federal licenses that may result in a discharge into navigable waters to provide the licensing agency a certification from the applicable state agency that the project will comply with state water quality laws. (33 U.S.C. section 1341(a)(1), (d)). As part of the FERC licensing process, the State Water Board may issue or deny a water quality certification for the Lassen Lodge Hydroelectric Project. If the State Water Board issues a certification, the conditions of the certification become mandatory conditions in the FERC license for the Proposed Project.

When the State Water Board considers issuing a water quality certification for a project, it evaluates whether the project will comply with applicable water quality standards and other appropriate requirements of state law and determines conditions necessary to protect water quality in California.

The Regional Water Quality Control Boards prepare basin plans that designate the beneficial uses of waters to be protected and establish the water quality objectives necessary to protect those uses, as required under section 303 of the Clean Water Act (33 U.S.C. section 1313) and sections 13240 and 13241 of the California Water Code. When establishing water quality

objectives, the Regional Water Quality Control Boards consider the past, present, and future beneficial uses of the water bodies; their environmental characteristics; economics; and water quality conditions that could be reasonably achieved through coordinated control of the factors affecting water quality. When the State Water Board considers issuing a water quality certification for a project, it evaluates whether the project will comply with the applicable basin plan and whether the beneficial uses of the applicable water bodies will be protected.

Therefore, issuance of a certification requires an analysis of the Proposed Project's effect on water quality, including whether the designated beneficial uses of the South Fork Battle Creek identified in the Water Quality Control Plan for the Sacramento and San Joaquin River Basins (Basin Plan) (CVRWQCB, 2018) will be adequately protected. The determination of the Proposed Project's ability to adequately protect these beneficial uses requires an understanding of South Fork Battle Creek water quality, including the existing conditions and the potential to support the full range of beneficial uses. The State Water Board will use CEQA documents—including any comments received from the public, tribes, or agencies during the certification process to inform and aid its review of the Proposed Project's effects.

1.3 Purpose of this Environmental Impact Report

CEQA requires a public agency with discretionary authority to issue a certification, permit, or other approval to evaluate the environmental impacts of its action. (CEQA Guidelines, section 15002). Issuance of a certification is a discretionary action (Pub. Resources Code section 21080; CEQA Guidelines, sections 15002, subd. (i), 15357). The State Water Board has the principal responsibility for approving the Proposed Project and is therefore the lead agency under CEQA. (Pub. Resources Code, section 21067; Cal. Code Regs. tit. 14, section 15367).

An EIR is a public document designed to inform the public and governmental agencies of a project's potential environmental effects and foster public participation and informed decision–making. The State Water Board has prepared this EIR to comply with CEQA.

This EIR is a project EIR that focuses on the changes in the environment that would result from the issuance of a certification and FERC licensing of the Proposed Project. Under CEQA, a project is analyzed for its environmental effects relative to baseline or existing conditions. (CEQA Guidelines, section 15125, subd. (a)). The existing conditions for this EIR are the physical environmental conditions at the time the Notice of Preparation of this EIR was published, which was February 10, 2015.

Consistent with section 21002.1 of the Public Resources Code (PRC), the purpose of this EIR is to identify any significant adverse environmental impacts of the Proposed Project, identify alternatives to the Proposed Project, and indicate ways in which significant effects can be mitigated or avoided. The State Water Board also seeks to facilitate public involvement and foster coordination among governmental agencies.

1.4 FERC's NEPA Process and Environmental Impact Statement

1.4.1 Background

Before FERC can undertake a major federal action, including the issuance of a new Federal Power Act license to Rugraw for construction, operation, and maintenance of the Lassen Lodge Hydroelectric Project, it must comply with the National Environmental Policy Act (NEPA).

Rugraw submitted its Final License Application (FLA) to FERC on April 17, 2014. However, based on comments and recommendations received from agencies, Rugraw prepared a Revised FLA, which it submitted to FERC on November 20, 2015. Serving as the lead agency under NEPA, FERC prepared a draft Environmental Impact Statement (EIS) that analyzed the environmental impacts of the Proposed Project and circulated it for public comment on December 4, 2017. In July 2018, FERC issued its Final EIS, which also analyzed the comments, conditions, and recommendations that FERC received during the NEPA process. On September 5, 2018, Rugraw submitted a second revised FLA that included new measures for protection of anadromous fish developed in consultation with NMFS. On February 4, 2019, FERC responded to Rugraw with its analysis of these measures and adopted them as part of its Final EIS Staff Alternative (NMFS, 2019).

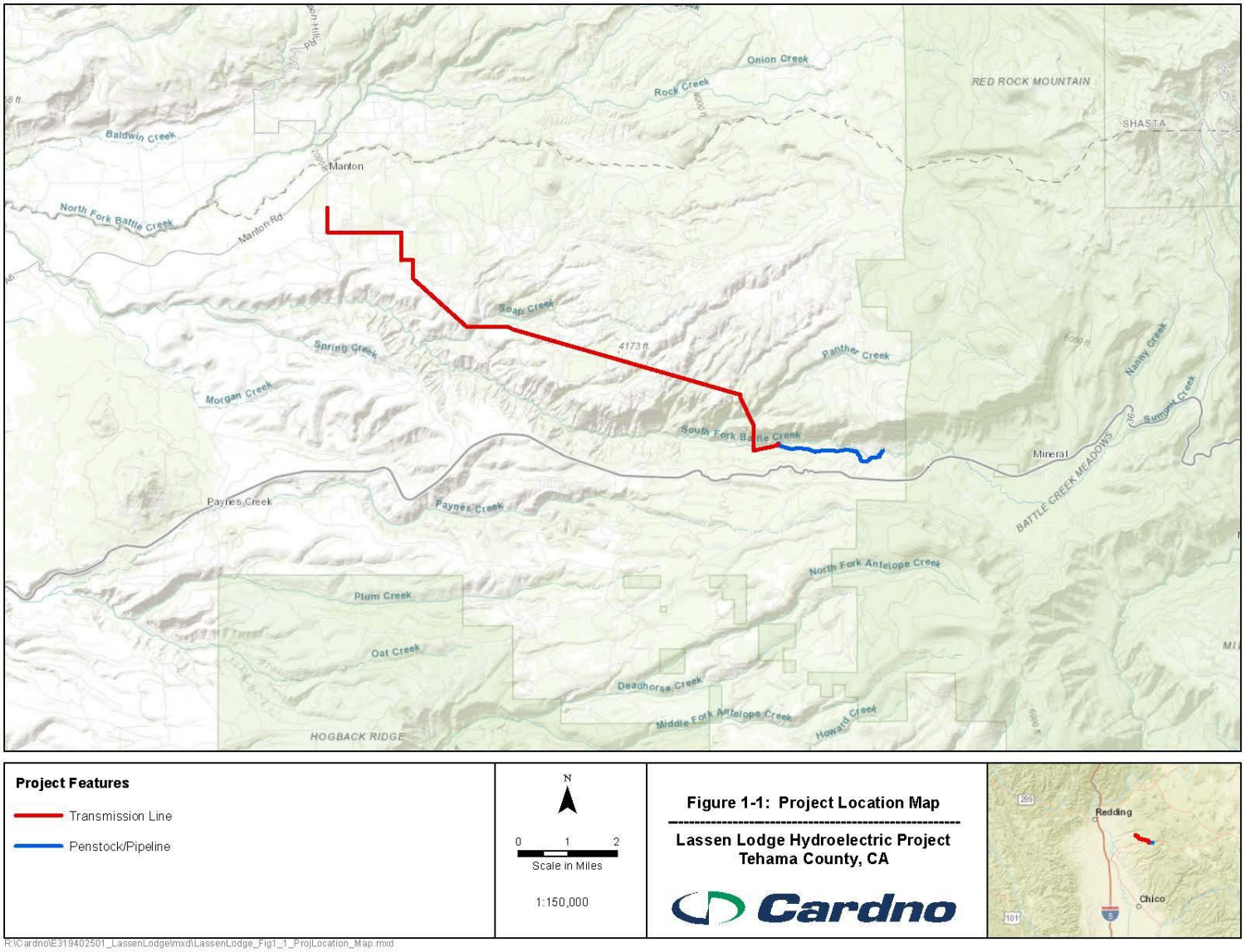

Figure 1–1. Proposed Project Location Map

1.4.2 Relationship to CEQA

CEQA Guidelines section 15221 states that for projects requiring compliance with both CEQA and NEPA, state agencies should use the EIS, rather than prepare an EIR, if the EIS complies with CEQA. However, the State Water Board determined that FERC's Final EIS was not sufficient to satisfy the requirements of CEQA. In addition, the State Water Board determined that additional analysis was necessary to fully understand the environmental impacts of the Proposed Project and ensure protection of water quality. Therefore, the State Water Board prepared this EIR.

In preparing this EIR, the State Water Board considered FERC's Final EIS as well as Rugraw's final license application and all amendments thereto, recommendations made by the California Department of Fish and Wildlife (CDFW), United States Fish and Wildlife Service (USFWS), and National Marine Fisheries Service (NMFS) pursuant to section 10(j) of the Federal Power Act, and the sediment transport, fish habitat, and water temperature studies completed as part of the FERC licensing process.

1.5 CEQA Process

Under CEQA, the State Water Board is the lead agency responsible for preparing an environmental document in connection with the State Water Board's consideration of Rugraw's application for a water quality certification for the Proposed Project. This section provides an overview of the CEQA process as it relates to this EIR.

The public involvement and scoping processes completed to date are documented in Appendix A (Scoping and Public Involvement). The State Water Board and FERC initiated a scoping period in November 2014 to solicit public, tribal, and agency input and comments on the Proposed Project and identify key issues that should be addressed in the environmental documents. Two scoping meetings were held on November 5, 2014, in Sacramento and Red Bluff. Four comment letters were received including from the Central Valley Water Quality Control Board, NMFS, Pacific Gas & Electric Company (PG&E), and Tehama County (Appendix A–1). PG&E expressed concern that the Proposed Project could affect the operations of their Battle Creek Hydroelectric Project (FERC Number 1121), which is located downstream of the Proposed Project. The Proposed Project would operate in run–of–river mode and would not affect the natural hydrology downstream of the proposed powerhouse tailrace or operation of PG&E's project. Therefore, this issue is not listed below (in *Areas of Known Controversy and Issues to be Resolved*) or further addressed in the EIR.

In addition to the joint scoping meetings, the State Water Board issued a Notice of Preparation for the Proposed Project on February 10, 2015 and received comment letters from two residents of Manton, CA and from CDFW (Appendix A–2).

With exception of PG&E's concern regarding their Battle Creek Hydroelectric Project, the issues identified during the public involvement and scoping processes were considered during the development of this EIR. Areas of known controversy and key issues addressed in this EIR are listed below.

1.5.1 Areas of Known Controversy and Issues to be Resolved

Key issues raised during the public involvement and scoping processes include:

- Potential biological resource impacts associated with the Proposed Project to state and federally listed species including resident fish and anadromous salmonids (fish passage), migratory birds, raptors, amphibians, and special–status plants
- Potential exacerbation of existing wildland fire risk due to the Proposed Project
- Potential water quality and temperature impacts in South Fork Battle Creek due to the Proposed Project
- Location of the transmission line route[3]
- Potential impacts of the Proposed Project on the Battle Creek Steelhead and Salmon Restoration Project
- Potential conflicts between the Proposed Project and policies of Tehama County's General Plan related to recreation, riparian zones, fish populations, and aesthetics.

Pursuant to CEQA Guidelines section 15221, the scope of the environmental analysis in this EIR includes the following:

- Evaluation of resource areas that require additional analysis under CEQA that are not required by NEPA (i.e., air quality, greenhouse gas emissions, energy consumption, noise (not related to wildlife), transportation, wildfire, and tribal cultural resources);
- Evaluation of the changes to the Proposed Project that resulted from additional agency consultation following issuance of FERC's Final EIS; and
- Determination of the level of significance of impacts under CEQA.

This Draft EIR is being circulated for agency and public review. The 45–day comment period concludes at 5:00 p.m. on Monday, November 9, 2020. The State Water Board will review all comments received on the Draft EIR and will prepare written responses to comments raising significant environmental issues, consistent with CEQA Guidelines section 15088. The Final EIR will include responses to comments and any changes to the Draft EIR.

1.6 Organization of the EIR

This EIR is organized into the following chapters:

- **Executive Summary:** Provides an overview of the Proposed Project and the alternatives evaluated in the EIR, a summary of the environmental impacts and mitigation measures, and a discussion of areas of controversy and issues to be addressed. The Executive Summary also sets forth Proposed Project objectives.
- **Chapter 1, Introduction:** Provides an overview of the EIR and CEQA process and identifies agency responsibilities.

[3] A potential conflict was noted between the alignment of the originally proposed transmission line route and existing land uses. Rugraw subsequently revised the alignment of the transmission line to address this comment. This revised alignment is part of the Proposed Project.

- **Chapter 2, Proposed Project Description:** Provides the description of the Proposed Project as well as background information on the Proposed Project.
- **Chapter 3, Alternatives Descriptions:** Provides a description of the process used by the State Water Board to identify and select alternatives to be considered and describes each alternative.
- **Chapter 4, Environmental Analysis:** Contains descriptions of the environmental and regulatory setting for each resource topic and provides an assessment of the Proposed Project's environmental impacts. This chapter also discusses applicant–proposed measures, required resource management and monitoring plans, and, where applicable, identifies additional mitigation measures required to reduce significant impacts. In addition, for each alternative, environmental impacts are analyzed for each resource where the alternative differs from the Proposed Project.
- **Chapter 5, Alternatives Summary:** Summarizes the alternatives analysis contained in Chapter 4, identifies the Environmentally Superior Alternative, and assesses the consistency of each alternative with the Proposed Project objectives.
- **Chapter 6, Cumulative Impacts:** Provides a discussion of the cumulative effects of the Proposed Project combined with other projects in the vicinity.
- **Chapter 7, CEQA–Mandated Sections:** Provides a discussion of other CEQA considerations related to the Proposed Project, including impacts found not to be significant, significant irreversible environmental changes, and growth–inducing impacts.
- **Chapter 8, List of EIR Preparers**
- **Appendices**

1.7 Intended Uses and Agency Responsibilities

This section describes the intended uses of the EIR, in accordance with CEQA Guidelines section 15124, subdivision (d).

The State Water Board intends to rely on this EIR for issuance of a water quality certification for the Proposed Project pursuant to CWA section 401. The State Water Board also anticipates relying on this EIR for any application to the United States Army Corps of Engineers (USACE) for the discharge of dredged or fill materials under CWA section 404 covered by the analyses contained in this EIR related to the Proposed Project. Additionally, to the extent the Proposed Project requires any other water quality or water rights permits, such as for construction, the State Water Board or the Central Valley Regional Water Quality Control Board would rely on this EIR.

The Federal Power Act (FPA) broadly preempts state authority over hydroelectric facilities. (*California v. FERC* (1990) 495 U.S. 490; *Sayles Hydro Assocs. v. Maughan* (9th Cir. 1993) 985 F.2d 451). One of the limited exceptions to this rule is issuance of water quality certifications under CWA section 401 for FERC licensing decisions. As previously discussed, CWA section 401 requires applicants for federal licenses or permits that could result in a discharge into navigable waters to apply for certification from the applicable state agency that their activities will comply with state and federal water quality standards and other relevant requirements of state law. Conditions of a certification become conditions of the federal permit or license.

As there is an application before FERC to issue an original license for the Proposed Project, the State Water Board may issue a certification under certain water quality conditions or deny certification based on the Proposed Project's impact on the state's waters. The FPA preempts most other state authority. Therefore, except where Rugraw or FERC have indicated otherwise, the State Water Board does not anticipate that other state or local agencies would undertake permitting or other discretionary actions subject to CEQA for the Proposed Project.

Additionally, although this EIR analyzes impacts of the Proposed Project to a broad range of environmental resource areas, implementation of any mitigation measures to resources outside the State Water Board's purview are dependent on agreements to implement such mitigation measures by Rugraw or FERC.

The State Water Board anticipates implementation of additional measures (e.g., recommended measures in this EIR or any modifications developed through the FERC licensing process that provide the same or better level of protection for the resource in question) would reduce impacts. The EIR notes where such protection would eliminate the potential for a significant impact. However, Rugraw has not affirmatively indicated it would implement such recommended measures. In these cases, the State Water Board has identified impacts that rely on implementation of these recommended measures in this EIR as significant and unavoidable.

Several agencies have responsibility for issuing permits or approvals for the Proposed Project or for resources that may be affected by the Proposed Project. As stated in FERC's Final EIS (Appendix A, page A–2), FERC expects its licensees will comply with all other federal, state, and local permitting processes, as appropriate.

Table 1–1 presents an overview of the various agency responsibilities and permits that may be required for the Proposed Project. Additional details on the necessary permits and approvals are provided in Chapter 4, Environmental Analysis.

1.8 References

Central Valley Regional Water Quality Control Board (CVRWQCB). 2018. Water Quality Control Plan for the California Regional Water Quality Control Board Central Valley Region for the Sacramento River Basin and the San Joaquin River Basin. Fifth Edition. Revised May 2018 (with Approved Amendments).

Federal Energy Regulatory Commission (FERC). 2018. Final Environmental Impact Statement for Hydropower License, Lassen Lodge Hydroelectric Project, FERC Project Number 12496–002. California. July.

Rugraw, LLC. 2018. Revised Final License Application for FERC Project Number 12496, Lassen Lodge Hydroelectric Project. elibrary.ferc.gov

U.S. Department of Commerce, National Oceanic and Atmospheric Administration National Marine Fisheries Service, West Coast Region (NMFS). 2019. Letter to Kimberly D. Bose, Secretary Federal Energy Regulatory Commission, "Endangered Species Act Section 7(a)(2) Letter of Concurrence for the Proposed Lassen Lodge Hydroelectric Project (P–12496), located on the South Fork Battle Creek, California". March 13, 2019.

Table 1–1. Overview of Potential Future Permit Approval and Consultation Requirements for the Lassen Lodge Hydroelectric Project

Agency	Jurisdiction, Permits, Approvals & Consultations
Federal Agencies	
FERC	Under the FPA, FERC has authority to issue licenses for up to 50 years for the construction, operation, and maintenance of certain hydroelectric projects. FERC is the lead federal agency under the NEPA process for the Proposed Project.
United States Army Corps of Engineers (USACE)	Under section 404 of the CWA, the USACE has authority to issue permits for the discharge of dredged or fill material into the waters of the United States, including wetlands. As the Proposed Project may discharge materials into the South Fork Battle Creek, it may require a section 404 permit.
NMFS	NMFS is responsible for conservation and management of fisheries to promote sustainability and prevent lost economic potential associated with overfishing, declining species, and degraded habitats. Under the FPA, NMFS provides comments and preliminary section 18 prescriptions, section 10(j) conditions, and section 10(a) recommendations on proposed hydroelectric projects. In addition, under the federal Endangered Species Act (ESA), NMFS has jurisdiction over federally listed anadromous species, and is required to consult with the lead federal agency to determine whether a proposed action is likely to jeopardize the continued existence of, or destroy or adversely modify critical habitat of, any federally listed anadromous species. Compliance with the ESA may require issuance by NMFS of permit(s) for activities that could adversely affect these species.
USFWS	Under the ESA, the USFWS has jurisdiction over federally listed terrestrial and freshwater species. Under section 7 of the ESA, USFWS is required to consult with the lead federal agency to determine whether a proposed action is likely to jeopardize the continued existence of, or destroy or adversely modify critical habitat of, federally listed terrestrial and freshwater species. Under the federal Migratory Bird Treaty Act, USFWS also has responsibility for protecting nearly all species of birds, their eggs, and nests. Additionally, under the federal Bald and Golden Eagle Protection Act, the USFWS is responsible for protecting and managing bald and golden eagles. Compliance with these acts may require issuance by the USFWS of permit(s) for activities that could adversely affect these species.

Agency	Jurisdiction, Permits, Approvals & Consultations
State Agencies	
State Water Board	As previously explained, section 401 of the CWA requires that prior to the issuance of a federal license or permit for an activity that may result in a discharge into navigable waters, an applicant must first obtain a certification issued by the State Water Board or the appropriate California Regional Water Quality Control Board. The State Water Board's discretionary action under CEQA is the issuance, issuance with conditions, or denial of a water quality certification for the Proposed Project under section 401 of the CWA. Under CEQA, the State Water Board is the lead agency for the Proposed Project and is responsible for issuing the EIR, adopting CEQA findings, and filing an associated Notice of Determination.
California Office of Historic Preservation	Under section 106 of the National Historic Preservation Act, lead federal agencies must consult with appropriate state and local officials, Indian tribes, and members of the public regarding the identification of cultural resources and preparation of a Memorandum of Agreement for adverse effects on resources listed in or eligible for listing on the National Register of Historic Properties. The California Office of Historic Preservation's State Historic Preservation Officer participates in section 106 consultation and reviews and approves the Historic Properties Management Plan.
CDFW	CDFW is responsible for maintaining native fish, wildlife, plants, and natural communities in California, as well as administering the California Endangered Species Act. Under the FPA, CDFW provides comments and section 10(j) recommendations on proposed hydroelectric projects. Under CEQA, CDFW is a Trustee and Responsible Agency with jurisdiction over natural resources affected by a project that are held in trust for the people of the State of California, such as the fish and wildlife of the state, designated rare or endangered native plants, game refuges, and ecological reserves.
California Native American Heritage Commission (NAHC)	Under section 106 of the National Historic Preservation Act, lead federal agencies must consult with appropriate state and local officials, Indian tribes, and members of the public regarding the identification of cultural resources. The NAHC participates in section 106 consultation and identifies, catalogs, and protects Native American cultural resources. The NAHC also oversees the handling of inadvertently discovered Native American human remains and burial items in California. In addition, the NAHC assists CEQA lead agencies with the identification of sacred lands and California Native American tribes traditionally and culturally affiliated with geographic areas.
California Department of Transportation (Caltrans)	Caltrans has discretionary authority to issue permits for transport of oversized loads on state highways.

Agency	Jurisdiction, Permits, Approvals & Consultations
Regional Agencies	
Central Valley Regional Water Quality Control Board (CVRWQCB), a Regional Water Quality Control Board (RWQCB)	The CVRWQCB shares responsibility with the State Water Board for protecting the water quality and beneficial uses of the South Fork Battle Creek watershed. The CVRWCB adopted and the State Water Board and the United States Environmental Protection Agency (EPA) approved the applicable basin plan, the Water Quality Control Plan for the Sacramento and San Joaquin River Basins. California RWQCBs, such as the CVRWQCB, also issue certifications pursuant to CWA section 401 for construction–related disturbances of water quality. The Proposed Project may be subject to the Construction General Permit for stormwater discharges associated with construction activity. This permit is required for all construction projects that disturb one or more acres of soil, and requires filing a Notice of Intent as well as the preparation and implementation of a Storm Water Pollution Prevention Plan (SWPPP)[a].
Local Agencies	
Tehama County	Tehama County has jurisdiction over planning, engineering, environmental health, traffic, and roads within Tehama County.
Tehama County Air Pollution Control District (TCAPCD)	Under state and federal law, the local Air Quality Management District (AQMD) is required to develop a plan for attaining ambient air quality standards. Under CEQA, the TCAPCD is a responsible or commenting agency for projects that may affect air quality.

a *General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities*. Water Quality Order Number 2009–0009–DWQ and National Pollutant Discharge Elimination System Number CAS000002, as amended by Order Number 2010–0014–DWQ, Order Number 2012–0006–DWQ, and any amendments, thereto.

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Chapter 2 Proposed Project Description

2.1 Overview

Rugraw, LLC (Rugraw) proposes to construct, operate, and maintain a 5 megawatt (MW) hydroelectric project on upper South Fork Battle Creek on the western slopes of the Cascade Range, approximately 1.5 miles west of the town of Mineral, an unincorporated community in Tehama County, California. The Proposed Project would be located entirely on private land, with the exception of areas located within existing county–owned roadway easements (see Figure 1–1, Proposed Project Location Map).

2.2 Proposed Project Objectives

As required by section 15124, subdivision (b) of the CEQA Guidelines, this EIR identifies project objectives. These objectives are used in evaluating alternatives to determine whether and to what extent the alternatives achieve the intent of a proposed project. In evaluating alternatives, a lead agency must consider both an alternative's consistency with project objectives and its potentially significant impacts.

The underlying purpose of the Proposed Project is to provide hydroelectric power. Three specific objectives related to this purpose, to be accomplished through the Proposed Project, are:

1. **Generate electricity for the term of the original license to produce electric power.** The Proposed Project would generate electricity to help meet California's power requirements. It would produce approximately 5 megawatts (MW) per hour of operation and is expected to produce an average of 24,936 megawatt–hours (MWh) per year.
2. **Provide renewable hydropower to help California meet its Renewables Portfolio Standard (RPS).** In 2002, the state of California established its RPS program, which requires that a specific percentage of electricity retail sales must come from renewable energy resources, which include small hydroelectric facilities. The Proposed Project would contribute to California's efforts to meet its RPS requirements by producing 5 MW per hour of operation and an average of 24,936 MWh of renewable energy per year.
3. **Identify and implement measures to avoid or mitigate damage to the environment, including fish and wildlife, and protect beneficial uses of South Fork Battle Creek.** The Proposed Project would develop and implement several plans and programs to ensure compliance with water quality standards and other appropriate requirements of state law. These management plans would address concerns related to fish and wildlife, as well as temperature, turbidity, pH, and other aspects of water quality. In addition, the Proposed Project would not affect the planned Battle Creek Salmon and Steelhead Restoration Project.

2.3 Proposed Project

A project is defined under CEQA as "the whole of an action, which has a potential for resulting in either a direct physical change in the environment, or a reasonably foreseeable indirect physical change in the environment" that requires a discretionary approval from a public agency. (CEQA Guidelines, section 15378, subd. (a)(3).) Further, the "term 'project' refers to the activity which is being approved and which may be subject to discretionary approvals by one or more agencies subject to CEQA. The term 'project' does not mean each separate governmental approval" (CEQA Guidelines, section 15378, subd. (c)).

For purposes of the environmental analysis contained in this EIR, the Project under consideration is the construction, operation, and maintenance of the Proposed Project, which includes FERC's Staff Alternative, as described in FERC's Final EIS (FERC, 2018) with two additional measures developed in consultation with NMFS after publication of the Final EIS. These measures are intended to protect listed species: (1) an anadromous fish monitoring program and (2) revised generation operating rules if anadromous fish are observed in the Proposed Project area.

The following sections of this chapter provide a description of the Proposed Project's:

- Facilities, including the diversion dam and pool; intake structure; control/fish screen structure; water conveyance pipeline and penstock; transition structure; powerhouse; tailrace; substation; transmission line; switchyard; powerlines; roads; and multipurpose areas needed for construction and for operations and maintenance;
- Operations;
- Construction Activities;
- Facility Inspections, Testing, and Maintenance;
- Rugraw–Proposed Measures; and
- Other Environmental Management and Monitoring Plans.

2.3.1 Proposed Project Facilities

The Proposed Project facilities would be located primarily on the south bank of South Fork Battle Creek between elevations of 3,417 feet and 4,310 feet above mean sea level[4] (amsl) (Figure 2–1, Proposed Project). Power generated from the Proposed Project would be transmitted via a new, approximately 12–mile–long, 60–kV transmission line ranging in elevation from 3,470 feet at the generation substation up to a maximum elevation of 4,422 feet, then down to an elevation of approximately 2,105 feet, where it would interconnect with the Pacific Gas and Electric (PG&E) Volta – South Transmission Line in the town of Manton, California.

2.3.1.1 Diversion Dam and Pool

The diversion dam and pool would be located on South Fork Battle Creek at river mile (RM) 23,[5] approximately 0.5 RM upstream of the Old State Highway Route 36 Bridge (RM 22.5), at the

[4] All referenced elevations are in feet above mean sea level.
[5] River miles are measured upstream from confluence of Battle Creek and the Sacramento River.

location of an abandoned logging flume that diverted water from the creek into a ditch conveying timber to the town of Manton.[6] The diversion dam, with a finished floor elevation of 4,302 feet and a water surface level (WSL) of 4,310 feet, would be a buttressed concrete stem wall, or supporting structure, placed in the streambed, perpendicular to streamflow. The diversion dam would be 63 feet in total length at an installed height of 8 feet above the natural streambed floor. The associated diversion pool would have a surface area of approximately 0.4 acre at normal WSL operating elevation of 4,310 feet.

The diversion dam would include six 8–by–8–foot pneumatic gates in the center of the structure with a sill elevation of 4,302 feet. When fully deflated, the gates lay would flat on the sill, resulting in release of the impoundment. The diversion dam would also include two sluice gates, one on each side at the bottom of the structure, to allow for sediment pass–through at higher flows and regulation of downstream flow releases.

The dam would also include downstream fish passage (discussed below), designed in coordination with CDFW.

[6] Historic sawmill sites and associated features have been evaluated (Tetra Tech 2015). None of the documented historic sites were deemed eligible for state or national registers. An analysis of historic resources can be found in *Section, 4.8 Cultural Resources*.

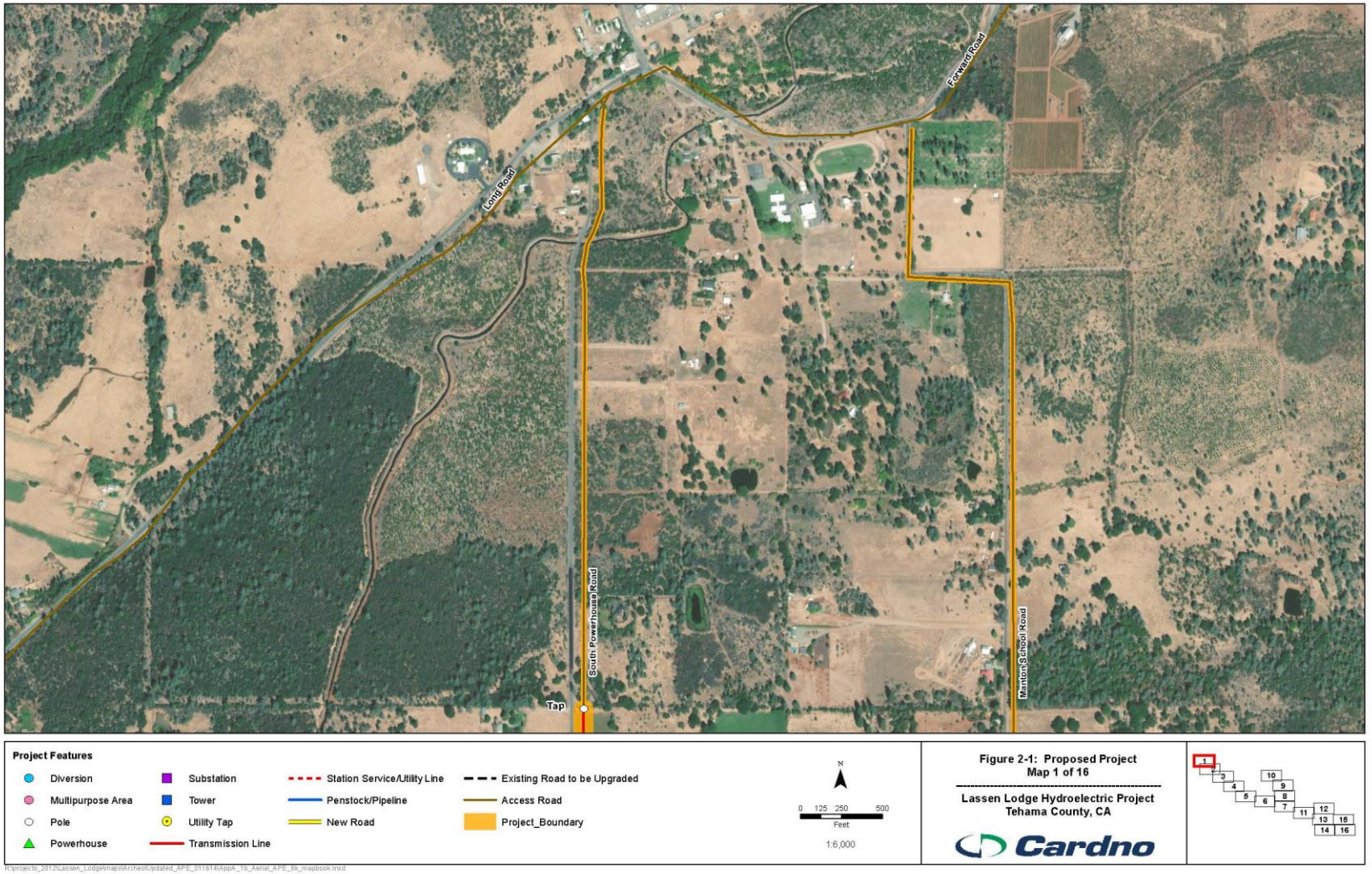
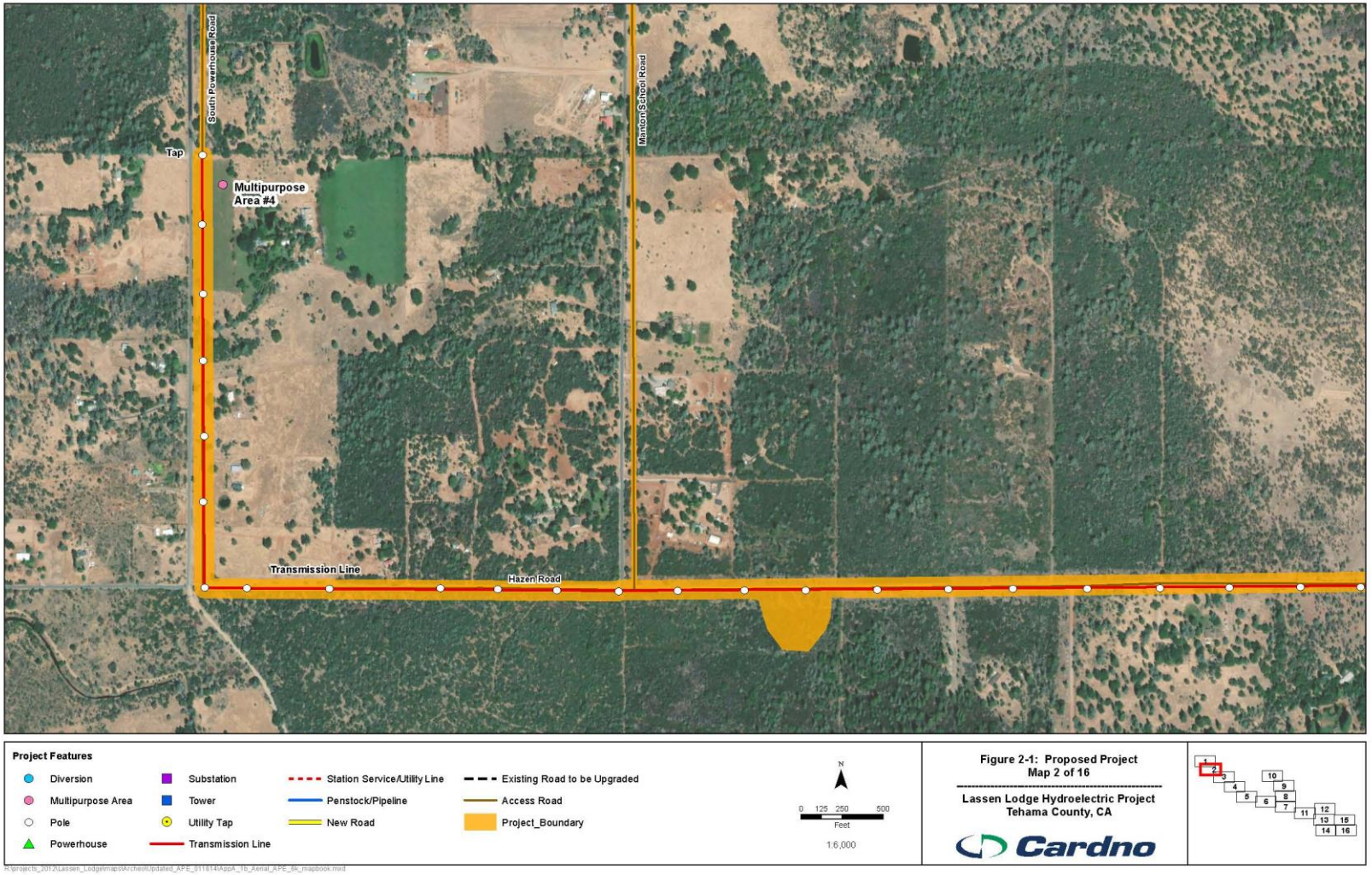


Figure 2–1. Proposed Project (Map 1)



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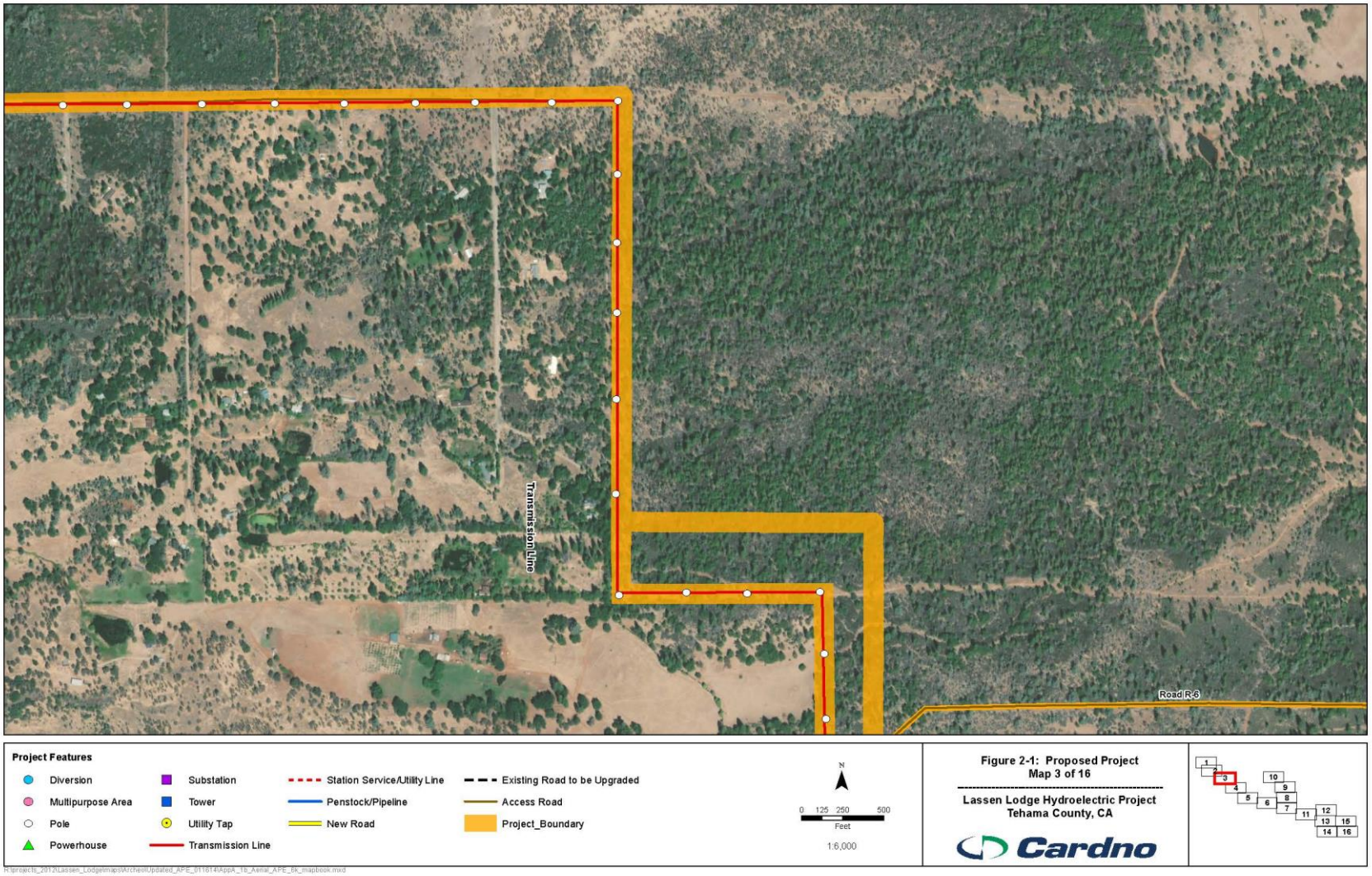

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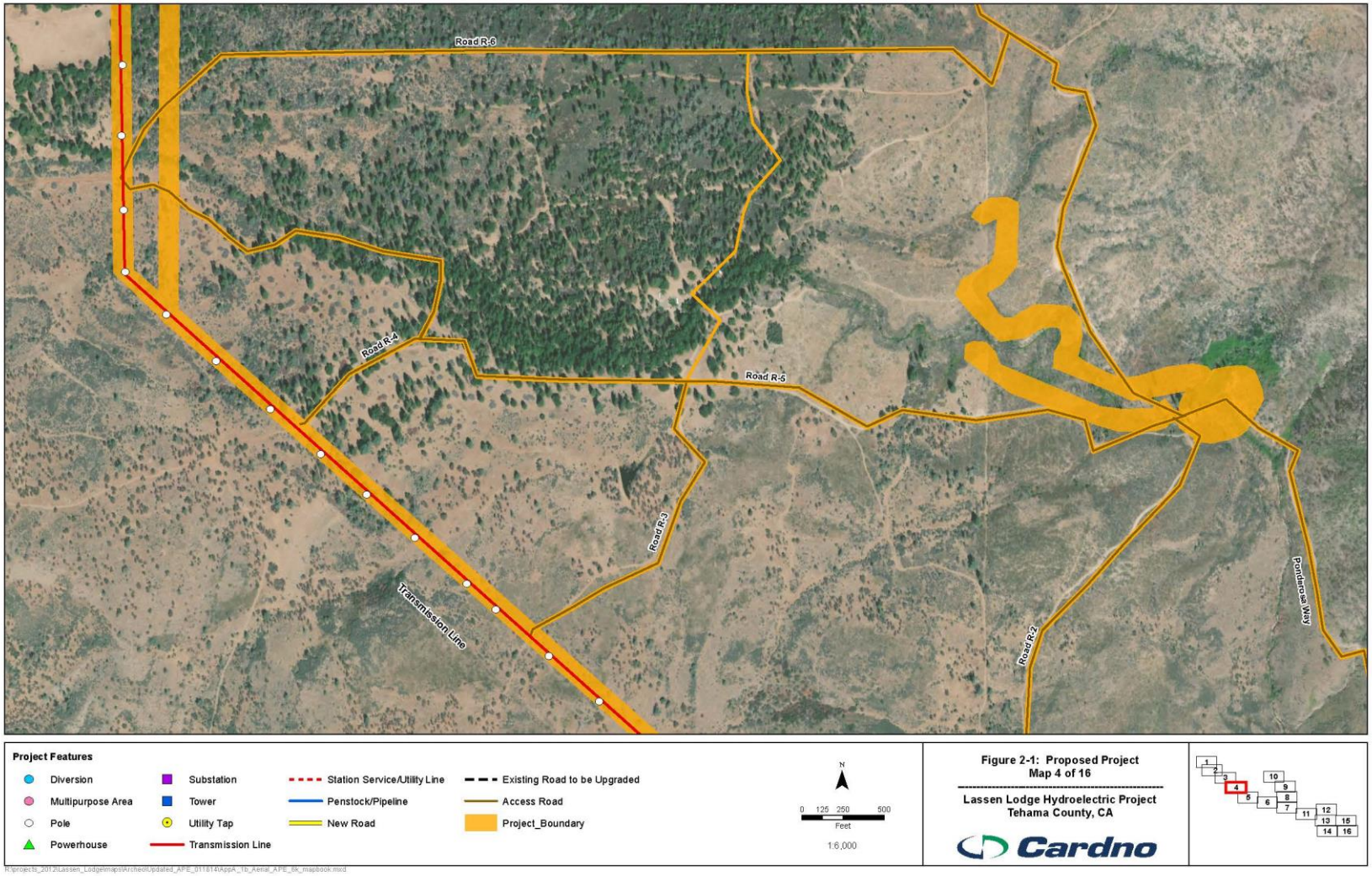
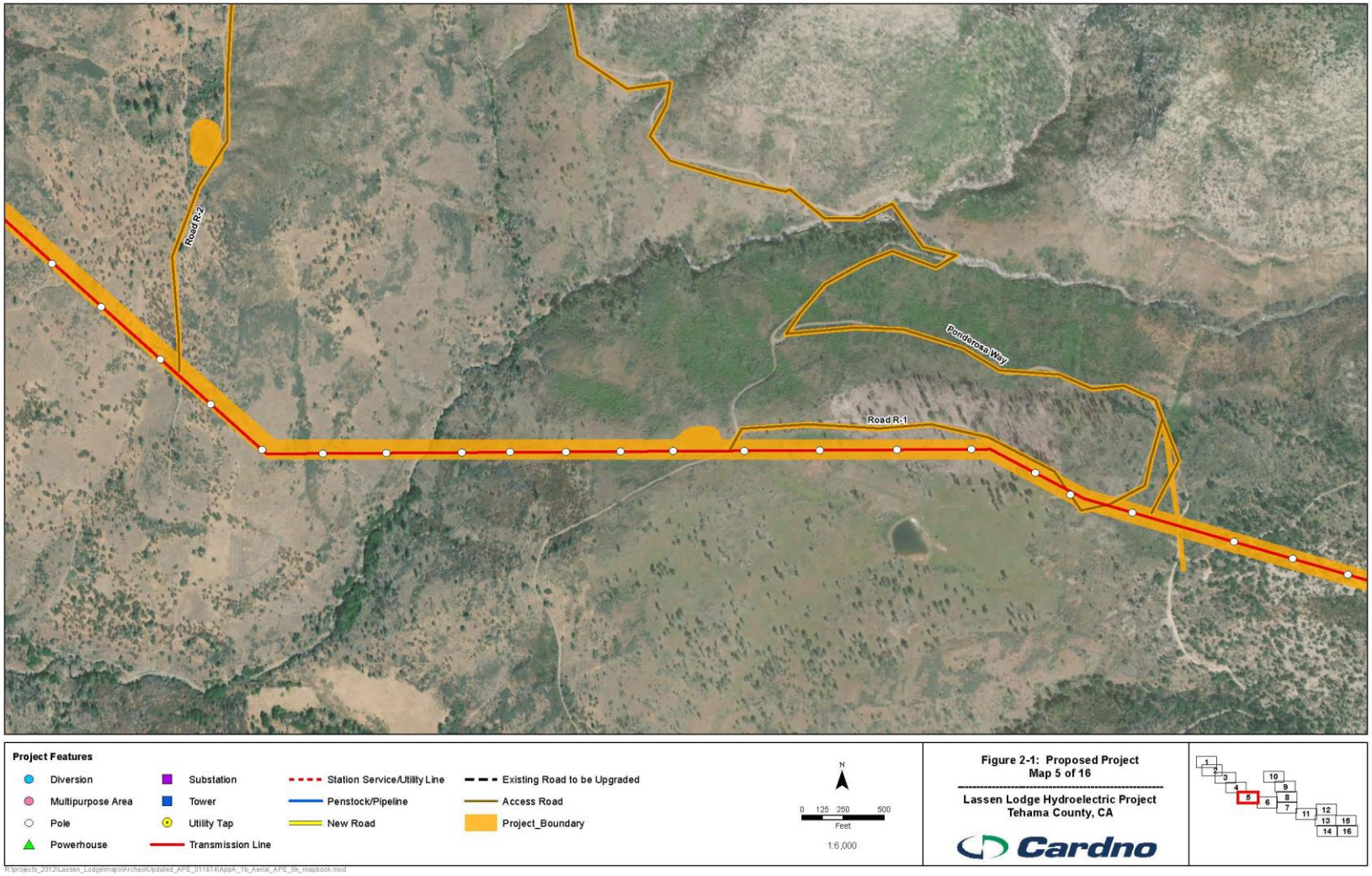


Figure 2–1. Proposed Project (Map 4)



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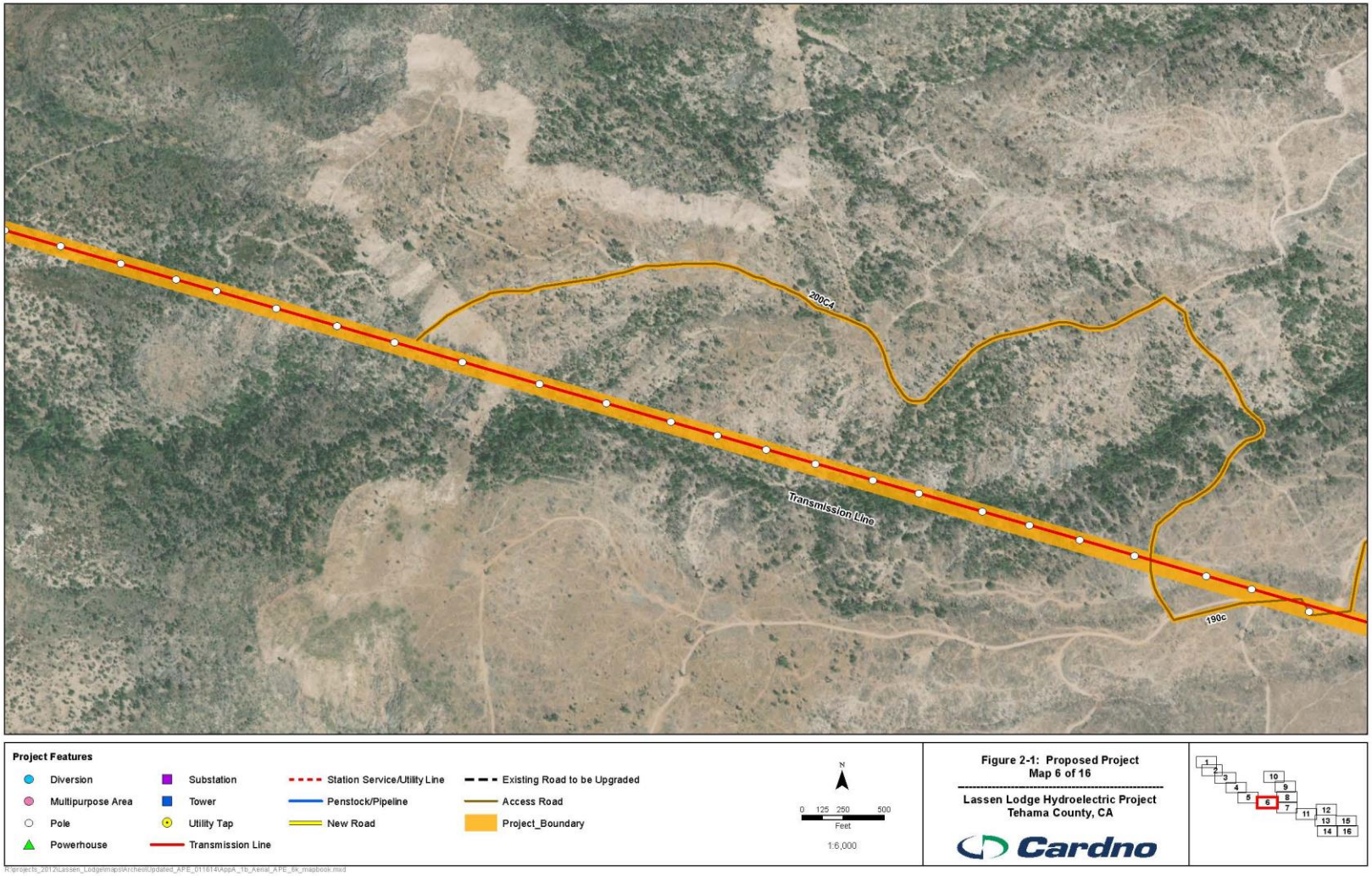

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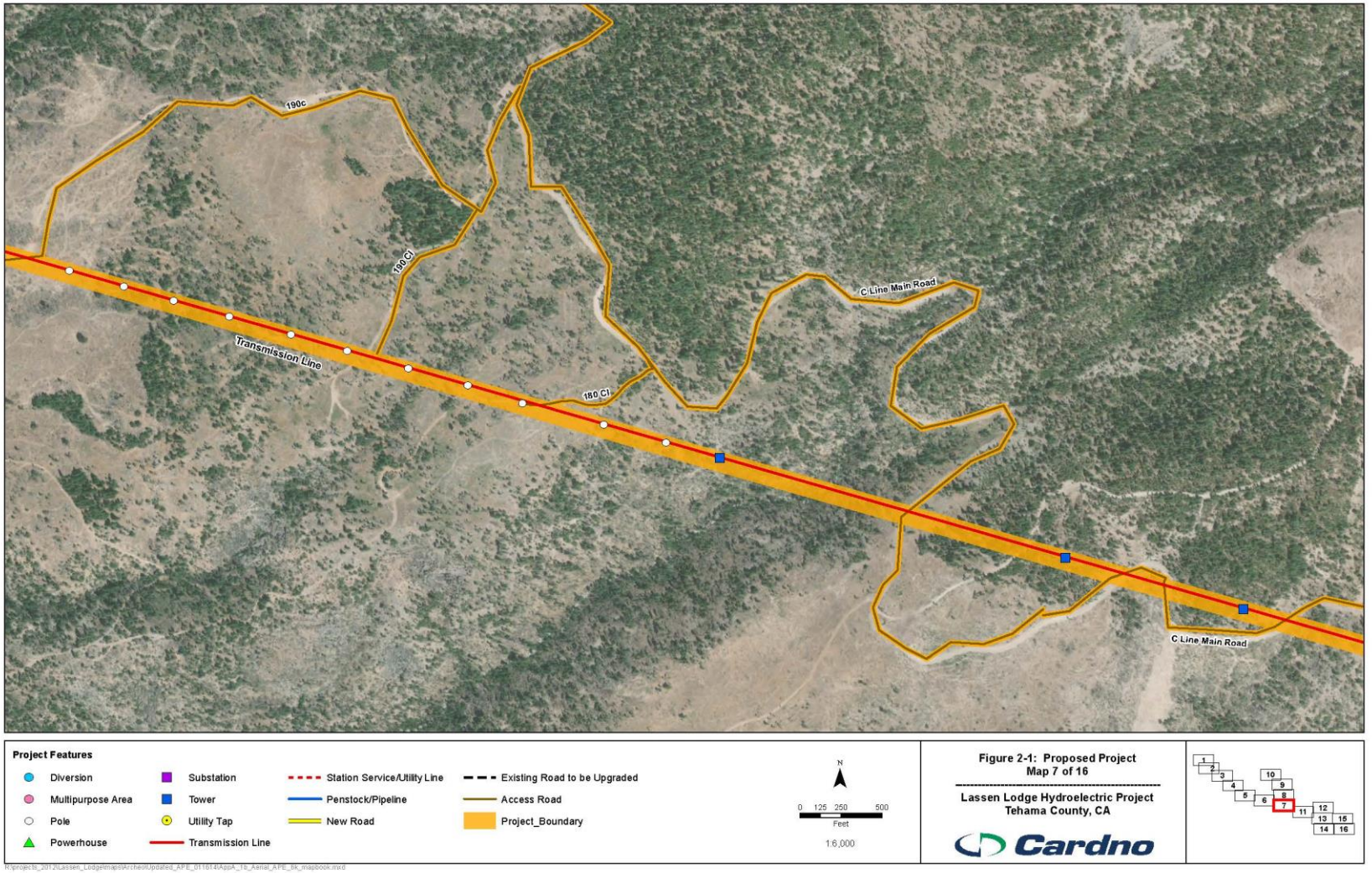


Figure 2–1. Proposed Project (Map 7)

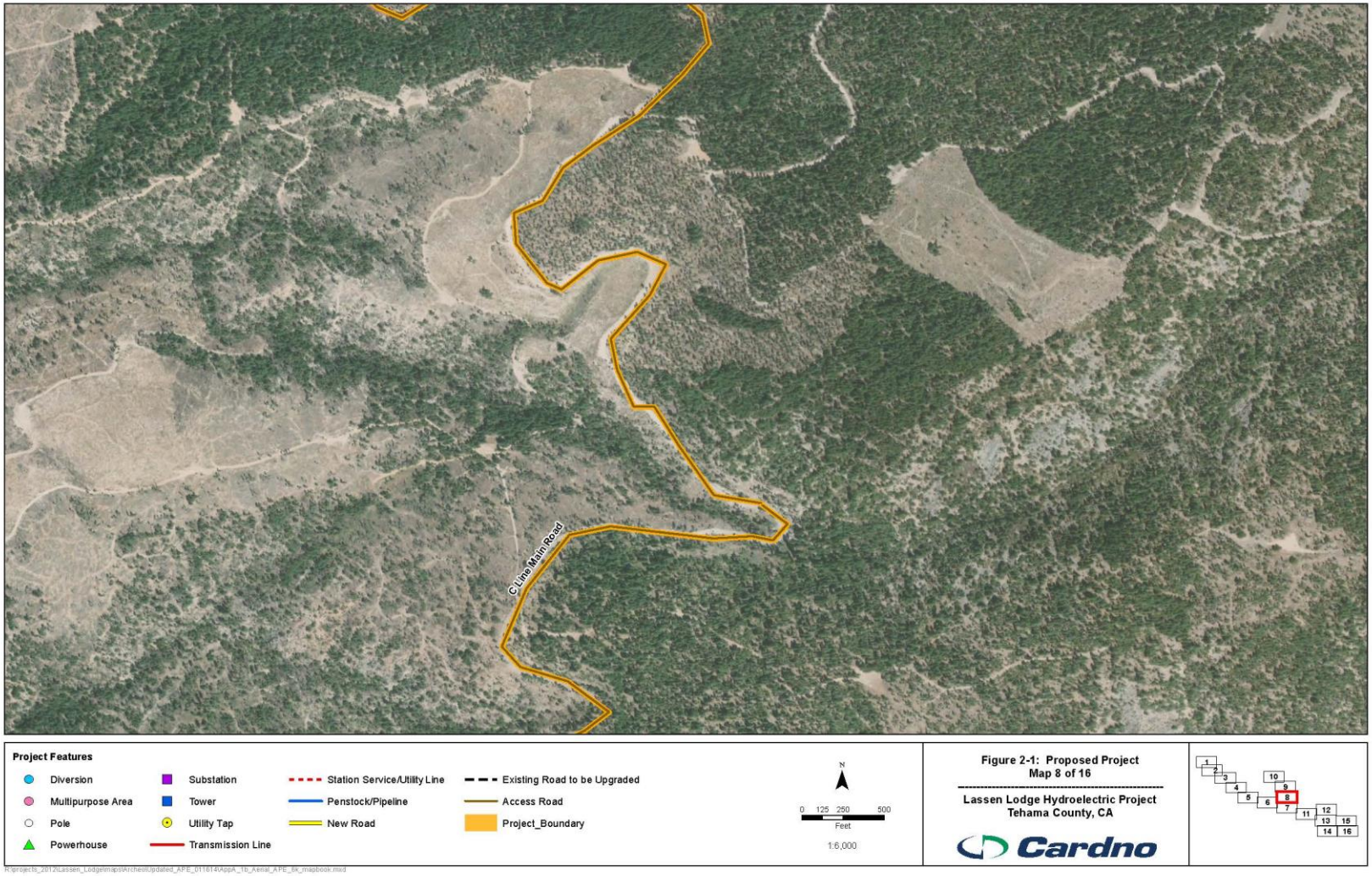
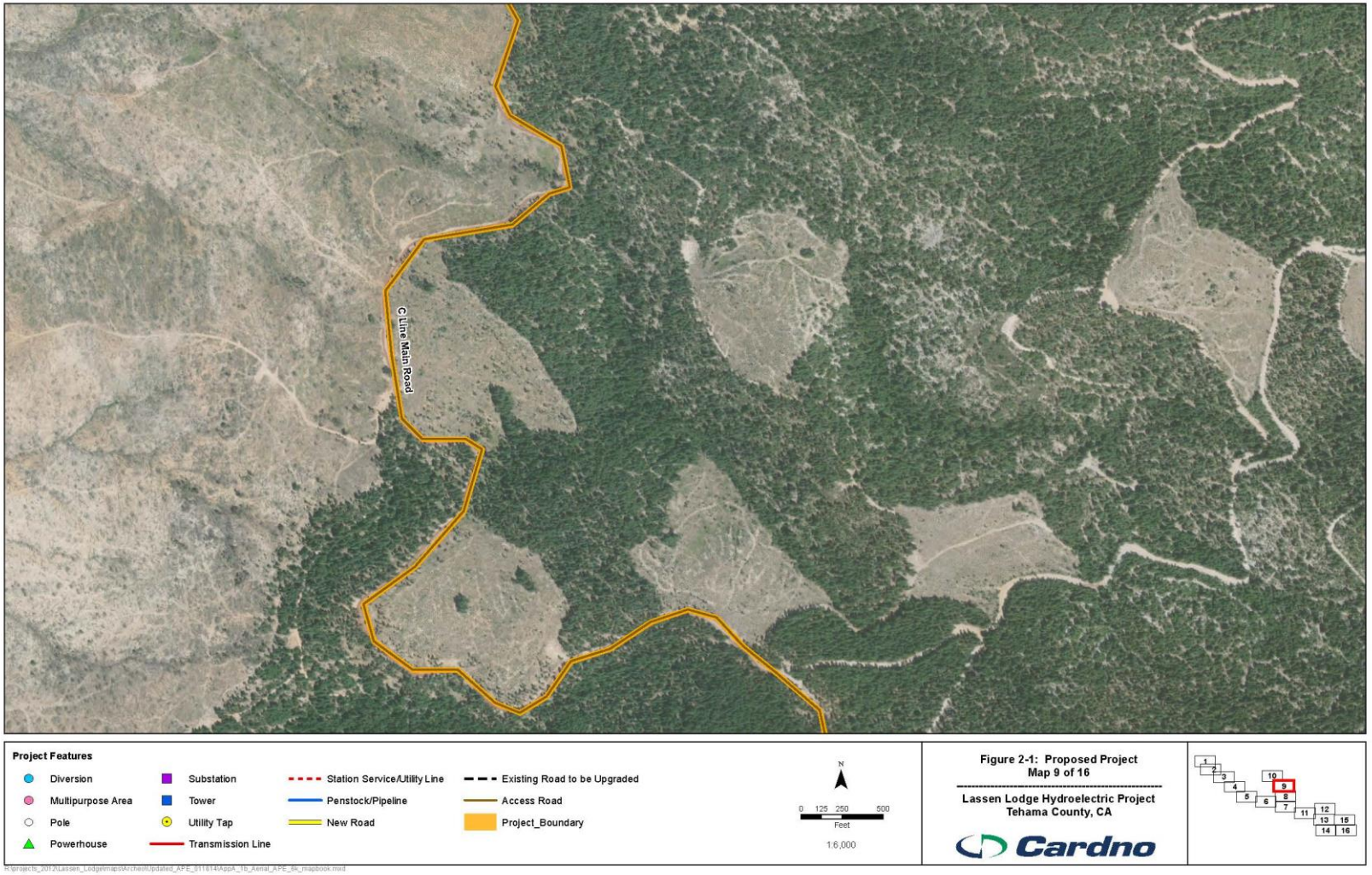


Figure 2–1. Proposed Project (Map 8)



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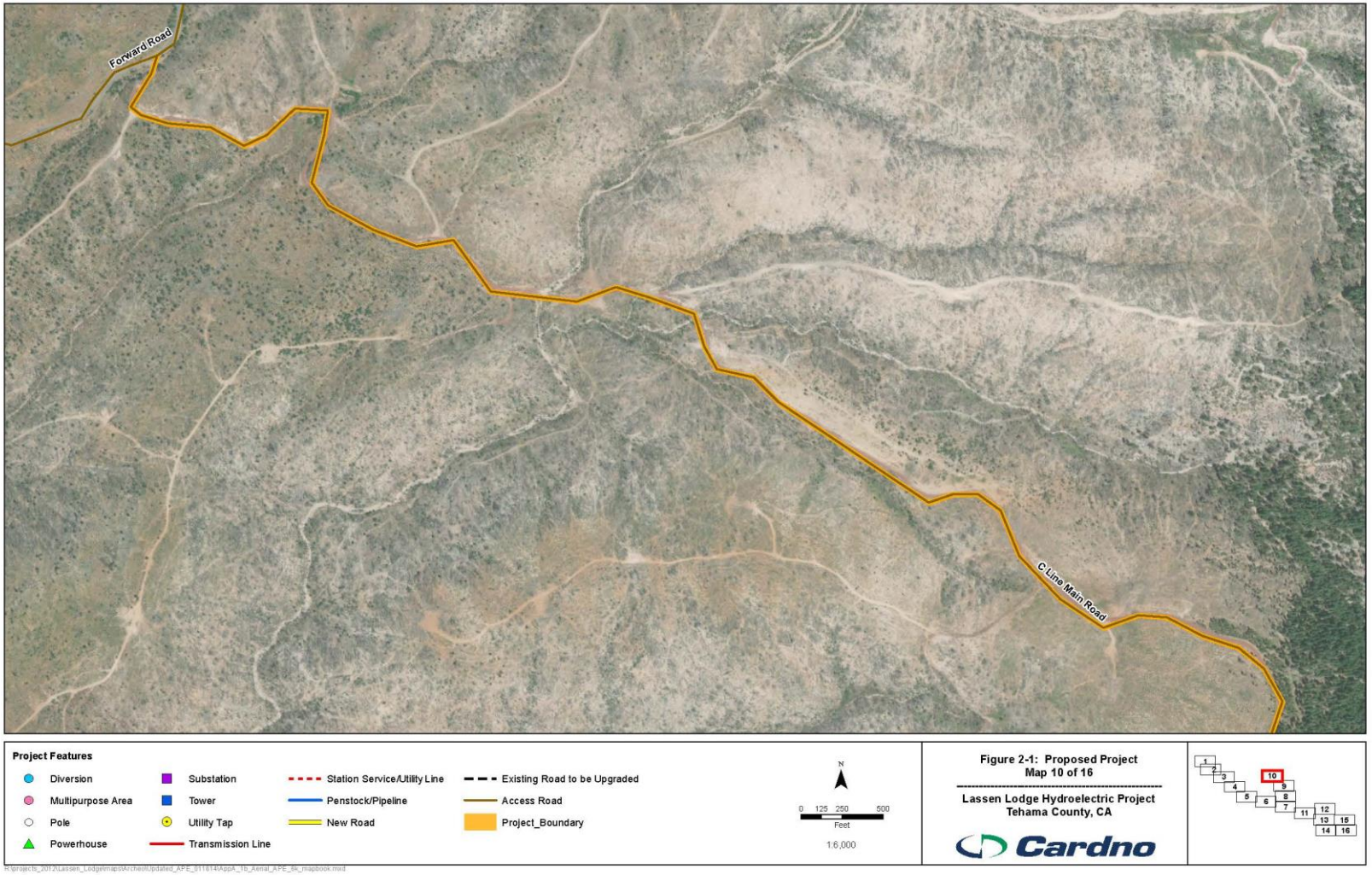

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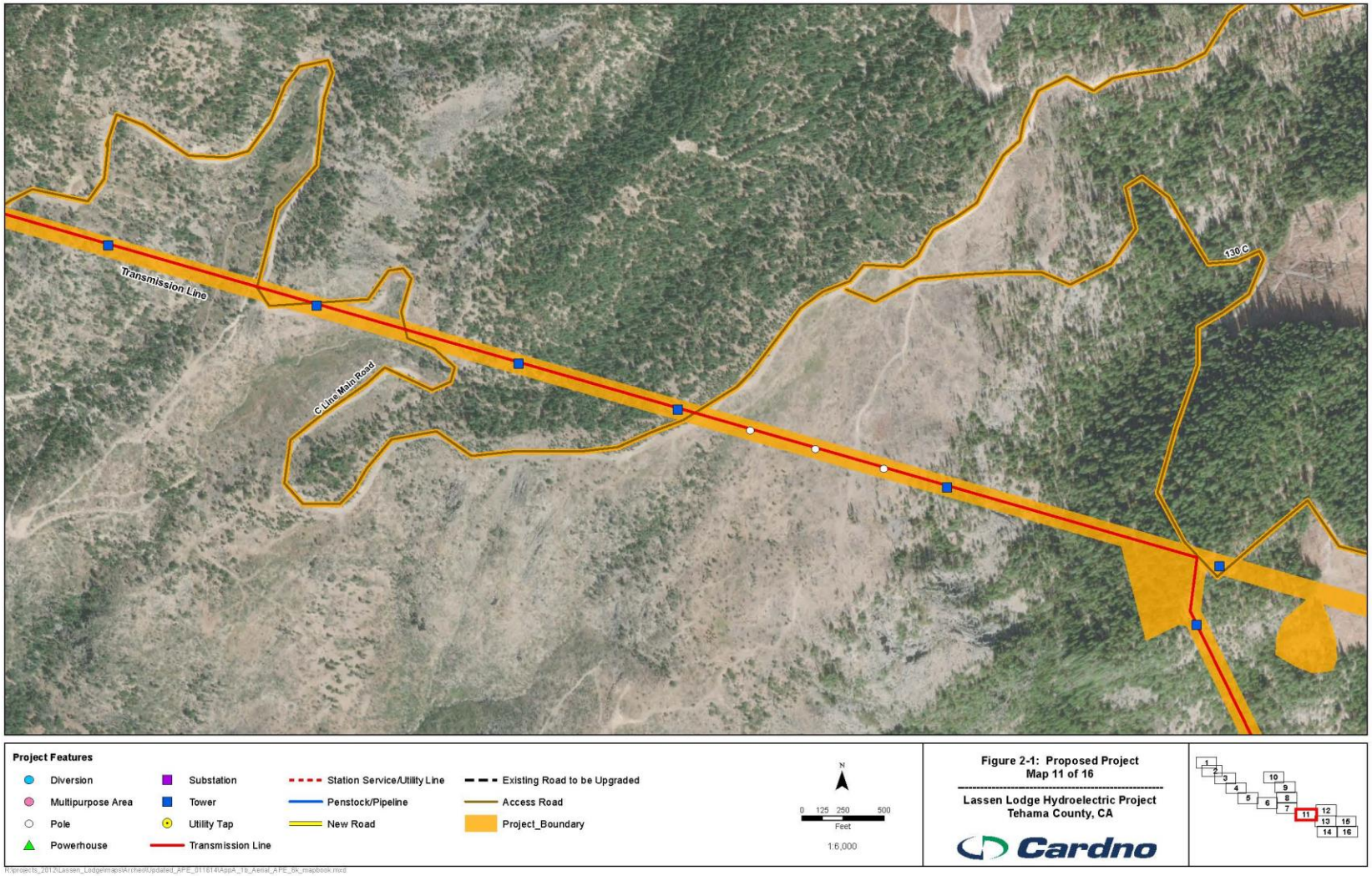

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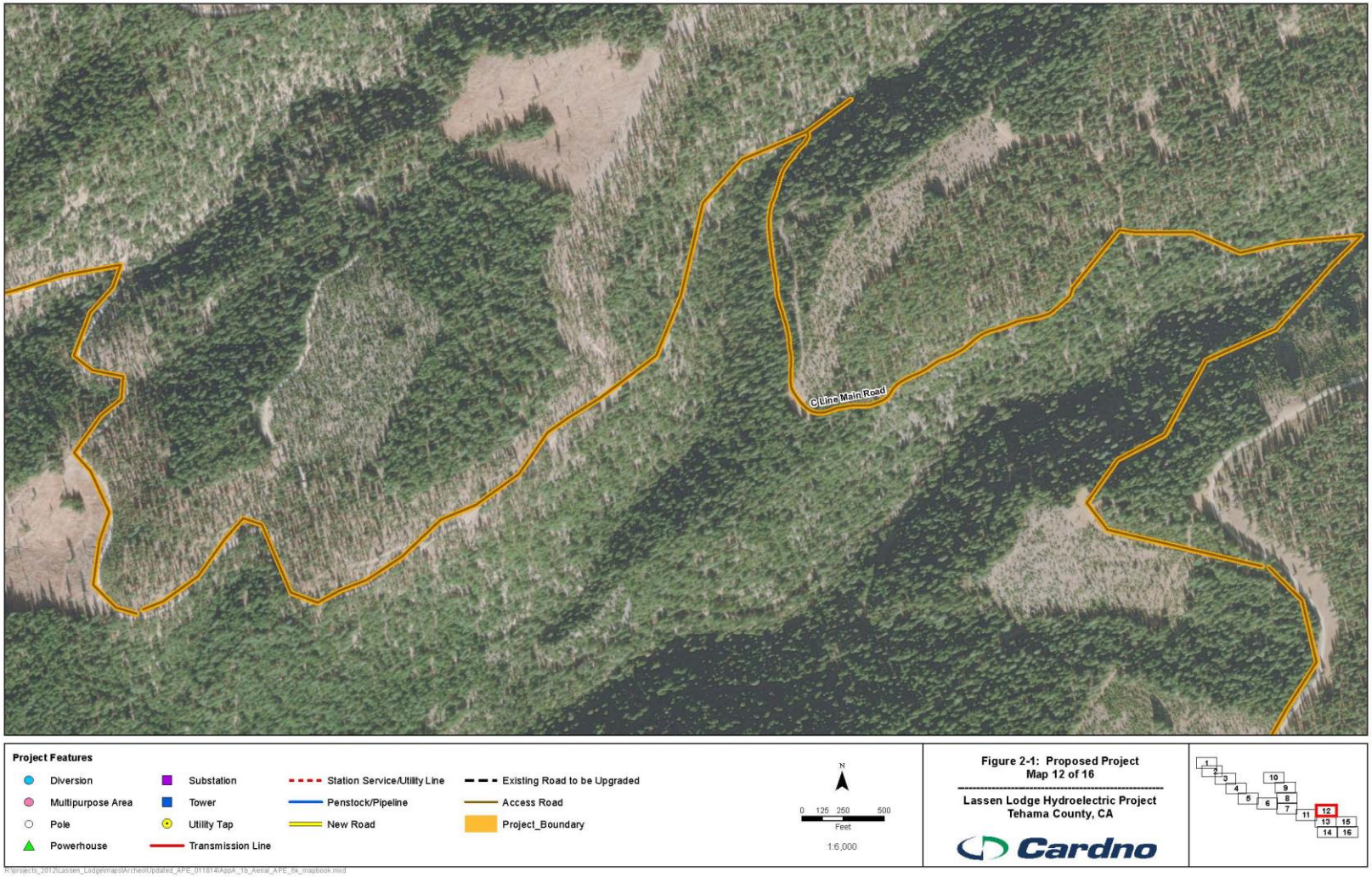

Figure 2–1. Proposed Project (Map 12)

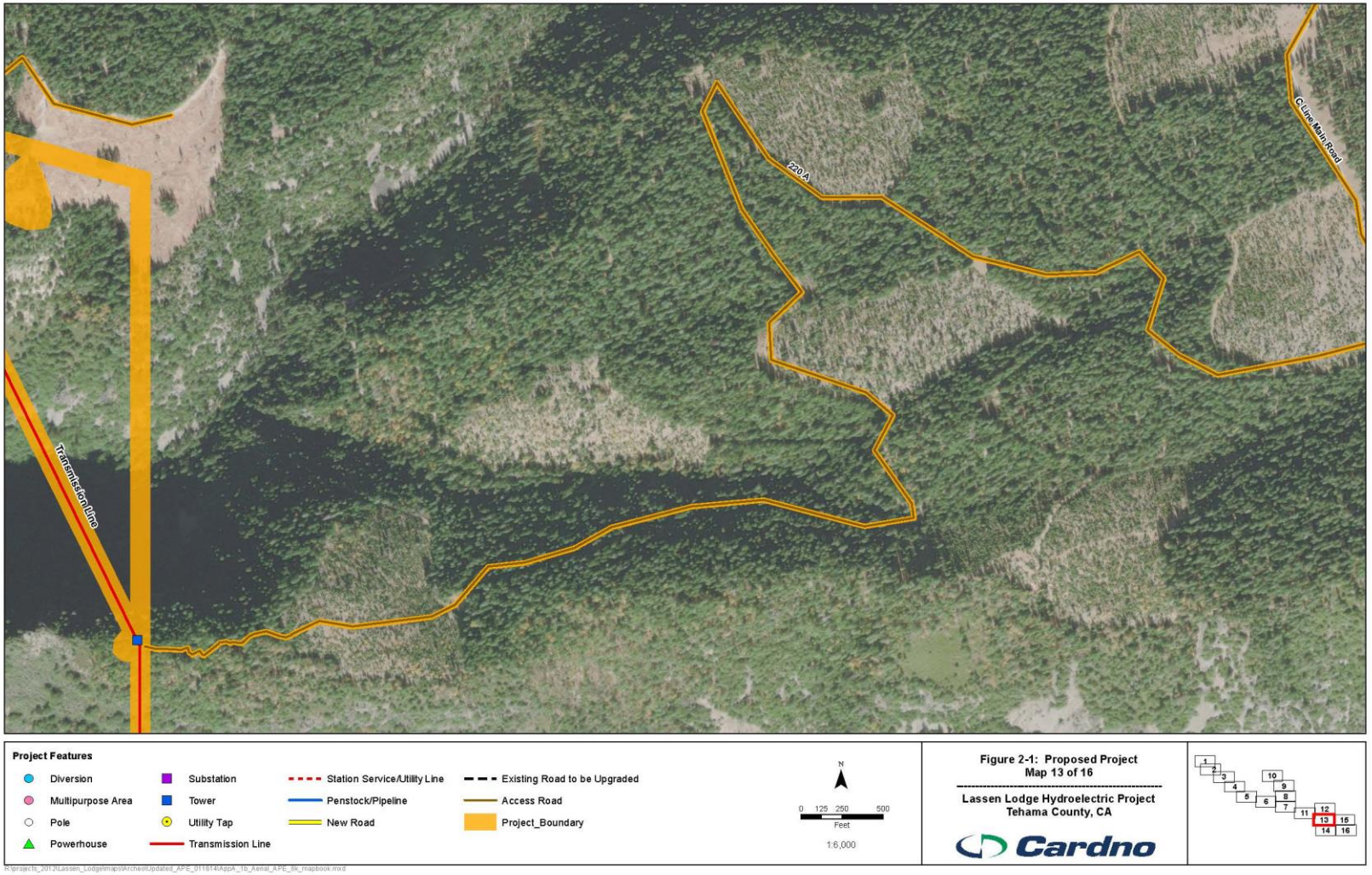

Figure 2–1. Proposed Project (Map 13)

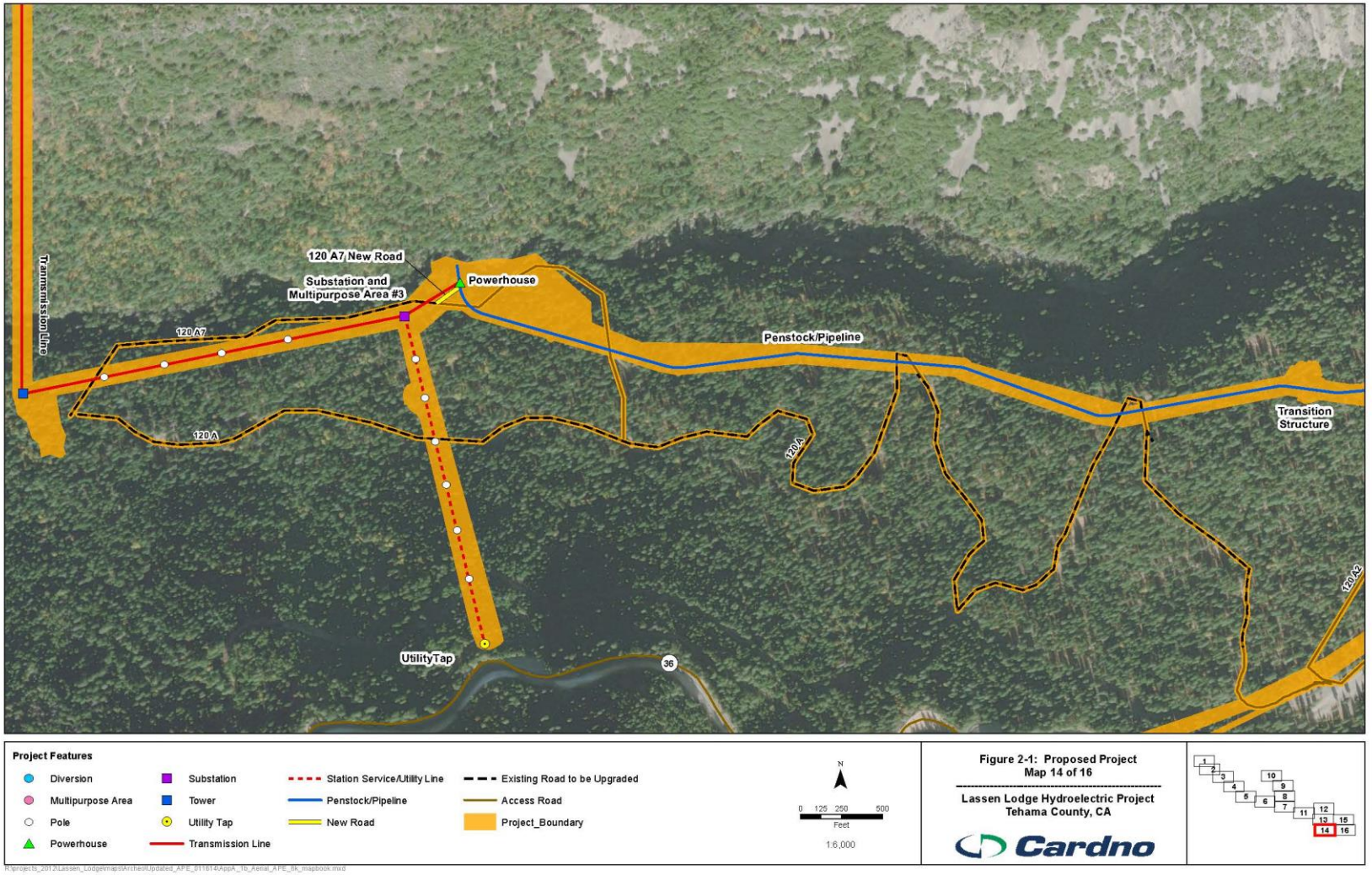

Figure 2–1. Proposed Project (Map 14)

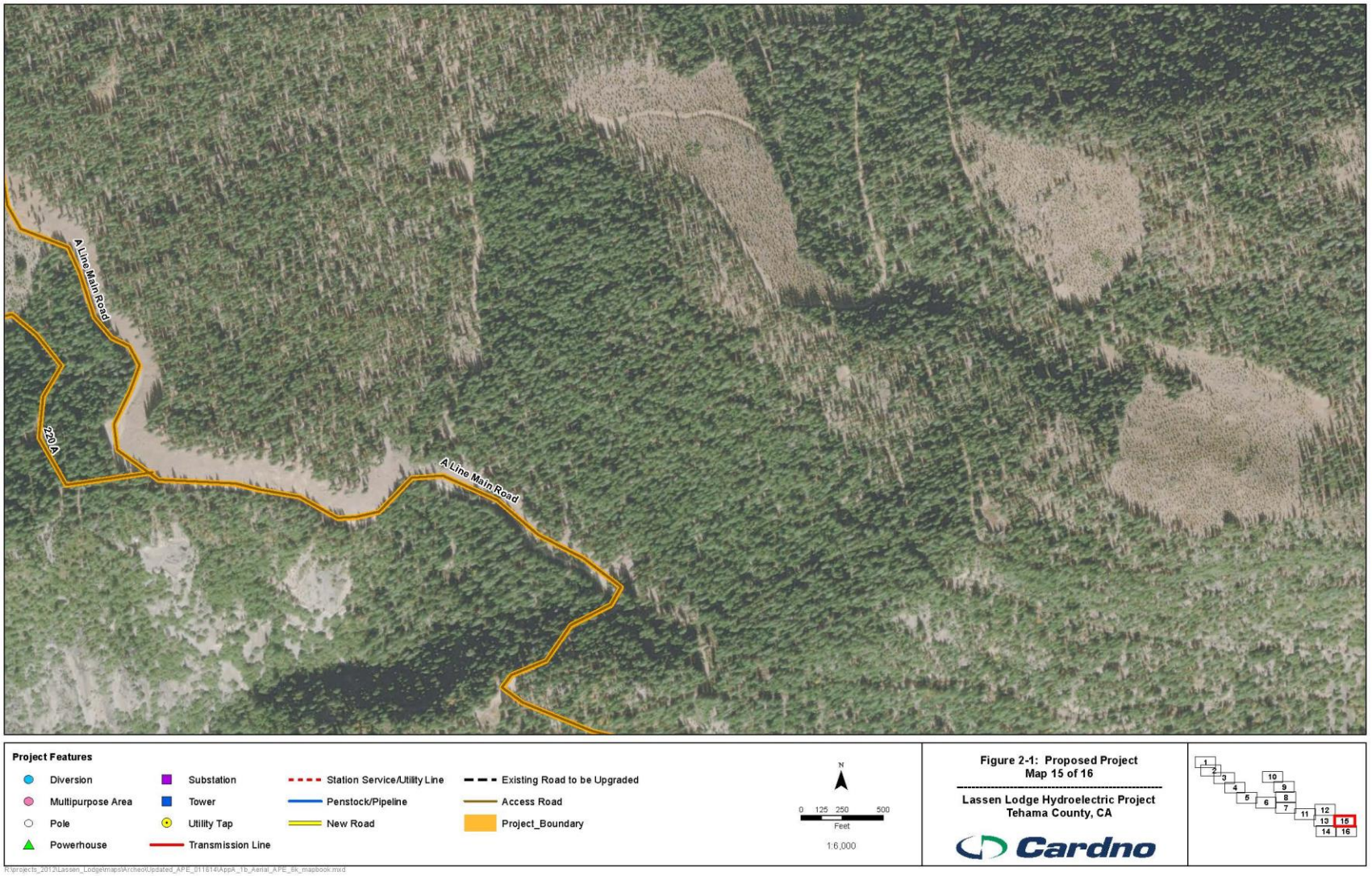

Figure 2–1. Proposed Project (Map 15)

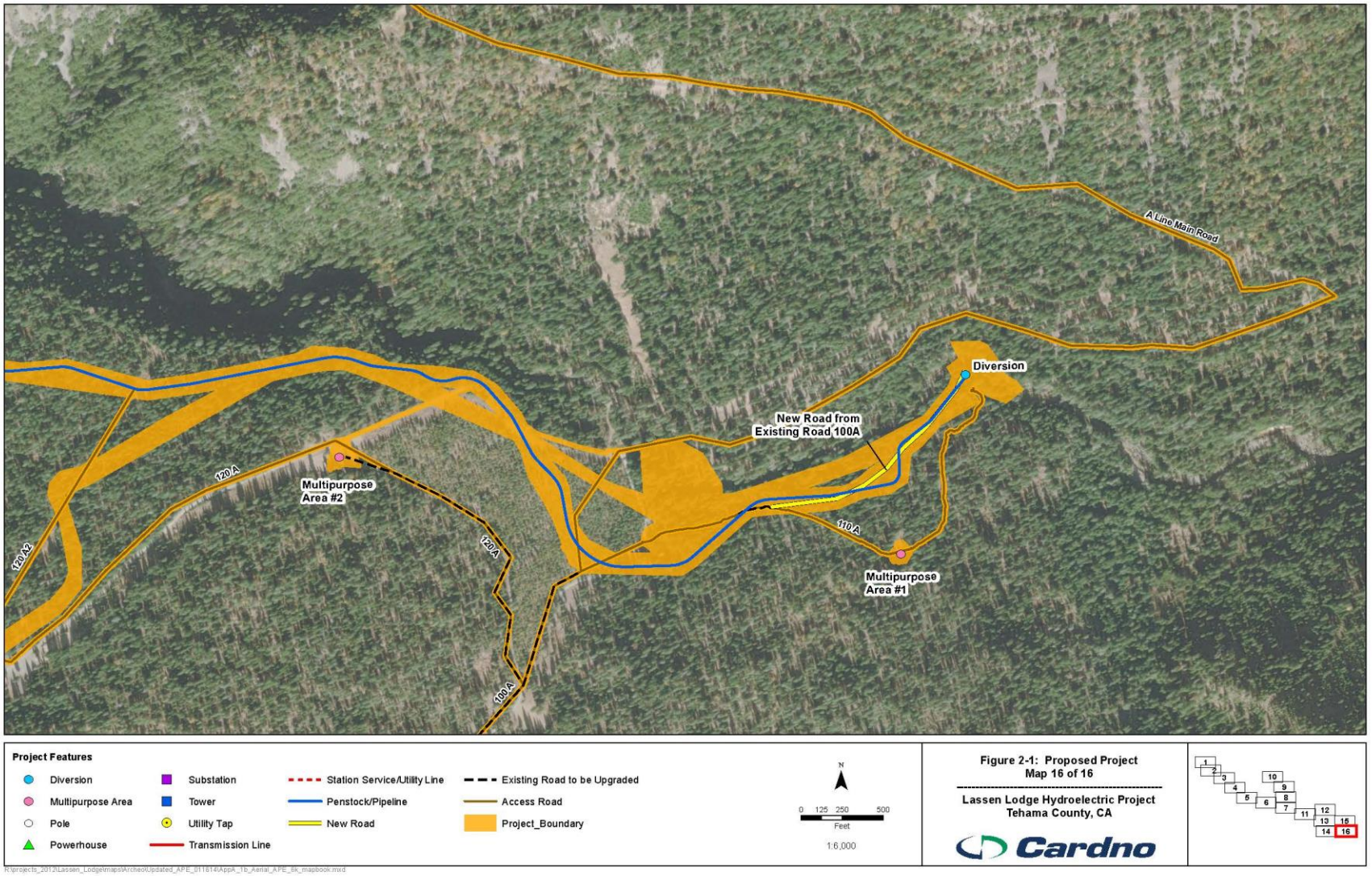

Figure 2–1. Proposed Project (Map 16)

2.3.1.2 Intake Structure

The intake structure (17–by–25 feet) would be a concrete structure located outside the normal high–water line on the south bank of the stream adjacent to the diversion dam. The intake would include two 4–by–8–foot trash racks (metal grating designed to prevent woody debris from entering the intake structure). Woody debris accumulating on the trash racks would be manually removed and placed in the stream channel below the diversion dam at a location where it would be allowed to move downstream during high flows. The intake structure would also have a manually operated valve/gate to flush any accumulated sediments.

During normal operations, the diverted water would pass through the intake structure and into the control/fish screen structure. A sluice gate (which can be either manually operated or automatically controlled) would isolate the intake structure from the diversion pool, preventing flow from being diverted during periods of non–operation and maintenance.

2.3.1.3 Control/Fish Screen Structure

From the intake structure, water would pass through the control/fish screen structure (approximately 20–by–74 feet). The control/fish screen structure will include a fish screen. The fish screen would be designed to meet fish screen and passage design criteria under the definition of a "canal" fish screen consistent with CDFW recommendations (CDFG 2002), NMFS screening criteria, NMFS Southwest Region Fish Screening Criteria for Anadromous Salmonids January 1997), and NMFS passage facility design criteria (NMFS Northwest Region Anadromous Salmonid Passage Facility Design July 2011). As a canal fish screen in the presence of resident trout fry, the design approach velocity would not exceed 0.40 feet per second, and screen face material (perforated plate or woven wire) screen openings would not exceed 0.09375 inch diameter and be spaced on 0.15626–inch centers.

Based upon the design criteria for a canal, the fish screen would consist of twenty–seven 4–by–8–foot stainless steel perforated plate panel screens. Specifications for each 4–by–8–foot screen panel are as follows:

- Hole type: round
- Pattern: 0.09375–inch diameter and be spaced on 0.15625–inch centers
- Pattern type: 60–degree staggered
- Open area: 33 percent
- Holes per square inch: 48
- Wetted screen area per panel: 29.69 ft^2
- Total wetted screen area: 800 ft^2

The fish screens would be automatically cleared by a travelling cleaner as frequently as necessary to prevent flow impedance and violation of the approach velocity criteria. Frequency of cleaning cycles would be determined by water level transducers (sensors) installed to continually monitor WSL on both sides of the screens. Operating WSL within the structure would be maintained within ±3 inches.

Also, per the design criteria for a canal, an 18–inch diameter fish return pipe would be incorporated into the fish screen. Flow passing the fish screens into the fish return pipe would

be maintained during project operations to allow fish entering the control/fish screen structure to be deposited in the stream below the diversion dam. The flow through the fish return pipe would be a part of the minimum instream flow maintained during Proposed Project operations.

2.3.1.4 Water Conveyance Pipeline and Penstock

The proposed water conveyance would include a 7,565 feet of 48–inch high–density polyethylene (HDPE) low–pressure pipeline, and a 5,230 feet of 36–inch welded steel high–pressure penstock. The total length of the pipeline/penstock, approximately 12,795 feet (2.4 miles), would be placed in the 40–foot–wide pipeline and penstock corridor (Tetra Tech, 2015). The pipeline and penstock would be buried in accordance with general engineering and construction practices to assure proper bedding and approximately 3 feet of cover.

The low pressure pipeline would begin at the control/fish screen structure (invert elevation 4,304 feet) and follow the general alignment of the former ditch approximately 7,565 feet (1.4 miles), where it would be joined to the high pressure steel penstock at a cast–in–place concrete transition structure at an invert elevation of 4,192 feet. The low–pressure pipe lengths would be adhered to each other by fusion welding and flanged joints. The 36–inch high–pressure penstock constructed of spirally welded steel American Society for Testing and Materials (ASTM) A–139 and ASTM A–252 standards would begin at the transition structure and terminate at the powerhouse (elevation 3,450 feet). The steel pipe would be field welded and inspected by third parties. Anchors, thrust blocks, and expansion joints would be provided as necessary. The exterior of the pipe would be protected against corrosion with the application of factory–applied coal tar enamel coating and the interior of the pipe would be protected with polyurethane lining.

2.3.1.5 Transition Structure

The transition structure would be an engineered cast–in–place concrete block structure located downhill from the control/fish screen structure and uphill from the powerhouse. It would encapsulate a fabricated bell reducer (a pipe fitting that joins two pipes of different diameter) providing the transition from the 48–inch low–pressure HDPE pipeline to the 36–inch high–pressure steel penstock. The transition structure would be buried with the pipes and not visible after construction is completed.

2.3.1.6 Powerhouse

The powerhouse would be located on the south bank of South Fork Battle Creek at RM 20.6 with a floor elevation of approximately 3,450 feet. The powerhouse would be 50–by–51–feet consisting of a reinforced concrete foundation and a metal building with sliding door (requiring disturbance of approximately 60–by–90–foot area). The powerhouse would contain all switchgear, circuit breakers, meters, valves, and controls necessary to operate and monitor the Proposed Project. The 36–inch diameter high–pressure penstock would enter the powerhouse at its southeast corner. The penstock would be anchored within an engineered thrust block, located approximately 40 feet upstream of the powerhouse. The 36–inch penstock would be attached to the thrust block via bolted flanges outside of the thrust block. From the downstream attachment point, the penstock would enter the powerhouse and attach to the turbine. A dresser–type coupling would be attached to the penstock approximately 3 feet upstream of the powerhouse foundation. The coupling would be contained within a vault allowing access and visual inspection.

The turbine would consist of one two–jet horizontal Pelton–type unit and would be closed–coupled to a synchronous generator. The design flow for the turbine would be 95 cfs. Minimum operational flow for the turbine would be 5 cfs and maximum flow would be 105 cfs. The generator would be 5 MW nameplate capacity at an effective net design head of 791 feet.

The intake, penstock, and turbines would be designed to prevent air entrainment and gas supersaturation in the powerhouse discharge waters. Increase of both air bubbles and dissolved air would be prevented by designing the intake to avoid vortices and prevent air entry into the pipeline. The Pelton turbine would spray water against the turbine buckets and casing, which would release dissolved gases at atmospheric pressure.

2.3.1.7 Tailrace

Tailwater from the turbine would exit at atmospheric pressure into the tailwater chamber (tailrace finished floor elevation 3,435.6 feet) within the powerhouse foundation. The tailwater would then enter the buried concrete box culvert (8–by–6 by–70 feet) and exit at the tailrace invert (outlet) elevation of 3,417 feet. The tailwater would then cascade 9 feet over existing large boulders to the rock–strewn streambed at RM 20.6 (elevation 3,408 feet). The observed high–water mark (1997, 100–year event) elevation is 3,414 feet (approximately three feet below the tailrace exit invert elevation). Tailwater exit velocity is projected not to exceed 3 feet per second at maximum operating flow.

2.3.1.8 Substation

An enclosed 40–by–42–foot security–fenced substation would be located approximately 500 feet west–southwest of the powerhouse (requiring disturbance of an approximately 50–by–51–foot area). Underground conduits from the powerhouse to the substation would convey generated power at 4,160 volts to the transformer located in substation where the power would be stepped up to 60 kV. The underground conduit would also be used to convey electricity from the Proposed Project powerline to the powerhouse via the substation when the Proposed Project is not operating. All underground conduits would be buried within the access road from the substation to the powerhouse.

2.3.1.9 Transmission Line

Power generated from the Proposed Project would be transmitted from the substation via a new approximate 12–mile long 60 kV transmission line within a 40–foot wide ROW easement to the point of interconnection (POI) on the PG&E 60 kV Volta–South transmission line in the town of Manton. The transmission line and appurtenant facilities would be located entirely on private lands with the exception of approximately 2 miles of transmission line, which would be located within the Tehama County road ROW on Hazen and South Powerhouse Roads.

The transmission line would be supported by both composite[7] poles and composite ‘H’ towers. The approximate locations are shown on Figure 2–1. A total of 100 to 135 composite poles and 10 to 15 composite ‘H’ towers, depending on final layout, would be required. Heights would range from 60 to 90 feet above grade. Fuel breaks would be provided along the alignment prior

[7] Composite poles are a combination of wood, steel, and concrete, and are made to have the appearance of wood. Composite poles are also fire resistant.

to installation of the transmission line. The fuel breaks would be maintained to minimize potential sources of ignition and inspected annually.

2.3.1.10 Switchyard

A switchyard would be constructed approximately 300 feet east of the POI on South Powerhouse Road within Rugraw's ROW easement on private lands. The security–fenced switchyard would contain the metering and protective devices as required by the utility. The 25–by–25–foot fence enclosed switchyard would disturb an area of approximately 40–by–35 feet with a depth of disturbance of up to 2 feet to accommodate the 10–by–10–foot foundation and floor slab for the concrete block wall.

2.3.1.11 Powerlines/Station Lines

Two new proposed powerlines/station lines and one buried electrical cable would be necessary for operation of the Proposed Project. Both powerlines/station lines would branch off of the existing PG&E 12kV electrical distribution powerlines and be within the ROW. Fuel breaks would be provided along these lines prior to their installation. The fire breaks would be maintained to minimize potential sources of ignition and inspected annually.

Substation/Powerhouse Powerline

A powerline would be installed to provide electricity and phone service to the substation and powerhouse. The powerline would be an approximately 0.5–mile–long 12 kV aerial line constructed within the 40–foot–wide ROW easement from the PG&E 12 kV distribution line located adjacent to Highway 36 to the substation/powerhouse. The powerline would be constructed on 8 composite poles approximately 60 feet above grade from Highway 36 to the substation, and would continue from the substation to the powerhouse via an underground conduit buried within the access road from the substation to the powerhouse. The installation of the poles for the powerline would require augured holes in the soil up to 8 feet deep and approximately 12 inches in diameter. The poles would be erected into the holes (directly embedded) and then backfilled for a secure installation.

Switchyard Powerline

To provide power and telephone service to the switchyard, an approximately 0.1–mile–aerial–12–kV power line would be constructed including one new tubular steel pole approximately 60 feet above grade. The switchyard powerline would be located between the existing PG&E distribution lines to the POI on South Powerhouse Road and the switchyard.

Diversion Power Supply

Power to the electrically powered diversion components would be supplied via a buried electrical cable within the penstock and pipeline ROW, from the 12 kV PG&E connection at substation/powerhouse to the diversion/intake facilities.

2.3.1.12 Proposed Project Roads

Access to Proposed Project facilities would occur mainly via existing roads. In general, these existing access roads include surfaced (paved or graveled) and unsurfaced roads that vary in width from 10 to 30 feet. The Proposed Project does not include any reconstruction, grading,

scraping, filling, alteration, demolition, or destruction of existing access roads, except for improvements to extend existing SPI logging roads 100A and 120A7 (Figure 2–1, maps 14 and 16). The Proposed Project would include the construction of two new permanent road extensions to access the diversion and intake facilities and to access the powerhouse and substation facilities.

Rugraw has a deeded easement in perpetuity for the area of the Proposed Project facilities on both sides of South Fork Battle Creek, from above the diversion/intake structures to below the powerhouse/tailrace and substation, including all existing and new roads needed to access these facilities. Except for new road extensions that would be maintained by Rugraw, these existing roads (discussed above) would be maintained by SPI as part of their ongoing timber operations. The transmission line and switchyard would be located within Tehama County's existing right–of–way and permitted for transmission line use via County encroachment permits.

Site Access

Vehicle access for the construction, maintenance, and operation of the northwestern portion of the Proposed Project (i.e., the transmission line corridor) would be from the town of Manton, entering at either Ponderosa Way or the SPI C line road. For the southeastern portion of the Proposed Project (diversion and take, pipeline, penstock, and powerhouse and tailrace locations), access would be from State Route 36 at SPI Road 100A. No improvements are planned for access road 100A other than maintenance grading to clean up and repair water drainage channels as seasonally required.

Within the southeastern portion of the Proposed Project and south of South Fork Battle Creek, Rugraw proposes the construction of two new road extensions that branch off existing access roads. A new permanent road extension approximately 350 feet in length and 20 feet in width with an 8–inch gravel base would be constructed to the Proposed Project powerhouse and substation from existing road 120A7. Approximately 3,500 feet of road 120A7 would be graded and resurfaced with gravel, as needed, with no increase in existing road width. The second new permanent road would be an extension of existing road 100A to provide access to the diversion and intake structures. The road would be approximately 2,000 feet in length by 20 feet in width, with an 8–inch gravel base. The road would be located within the proposed 40–foot–wide pipeline and penstock corridor, from existing road 100A up to the diversion and intake structures. Newly built road extensions to access project–related facilities would be maintained by Rugraw.

Operation and Maintenance

Periodic use of access roads for Proposed Project operations would occur as needed and would typically involve up to four vehicle trips per week by Rugraw personnel.

Periodic use of the access roads for Proposed Project unscheduled maintenance would occur as needed and would typically occur over a few days. Typically, regular maintenance could involve up to 24 vehicle trips per week by Proposed Project personnel and would most likely occur in the fall, during a 2– to 4–week period.

2.3.2 Proposed Project Operations

Rugraw proposes to operate the Proposed Project as a run–of–the–river project. The Proposed Project is expected to produce approximately 5 MW per hour of operation, and between 21,000,000 kilowatt hours (kWh) and 30,000,000 kWh annually (average of approximately 25,000,000 kWh). Proposed Project operations would be constrained by:

- *Physical capacity of the Proposed Project facilities.* The proposed turbine has an operating range of 5 cfs to 105 cfs. Generation would be shut off when flows in the river exceed 418.
- *Regulatory requirements.* Compliance with proposed minimum instream flow, ramping, and temperature requirements would influence Proposed Project operations.
- *Minimum instream flow*. Maintain a Minimum Instream Flow (MIF) of 13 cfs or inflow, whichever is less, as measured just upstream of Spring Number 4 influence, in the bypass reach.
- *Ramping requirements*. Provide a ramping rate (both down and up ramping) that does not exceed 1 inch of stage change per hour as measured at the staff recommended monitoring gage located just downstream of the diversion dam.
- *Runoff.* Since the Proposed Project does not have any appreciable storage, operations are solely dependent of runoff. Lower summer baseflows generally preclude generation. The operating season typically begins in October/November, depending on runoff, and continues until the beginning of the baseflow season in July. Occasionally rainfall in August and September can provide suitable flows for short–term generation.

Rugraw proposes to release a minimum flow of 13 cfs to the bypass reach. As the powerhouse requires a minimum of 5 cfs to operate, when river inflows are less than 18 cfs (13 cfs for the minimum flow plus 5 cfs required for turbine operation) the Proposed Project would not operate. When inflow is less than 18 cfs, the pneumatic gates lower and inflow remains in the channel. When inflow is greater than 18 cfs, flows greater than 13 cfs would be diverted for generation, up to the turbine's maximum hydraulic capacity of 105 cfs. Streamflows greater than the combined hydraulic capacity of the turbine and the proposed minimum flow of 13 cfs would proceed unimpeded through the bottom sluice gates in the diversion dam and, when the capacity of those gates are exceeded, the pneumatic gates would be lowered allowing additional flow to enter the bypass reach. Table 2–1 depicts how the diversion dam pneumatic gates and powerhouse would operate under the range of expected flows.

2.3.2.1 Water Management

During the low flow summer/early fall period, the pneumatic gates and bottom sluices would be fully open allowing the natural flow of South Fork Battle Creek to move downstream past the diversion. To first establish the diversion pool to a level that would allow for the commencement of diversions, the sequence of operation is as follows:

The pneumatic gates would be automatically raised (closed) to the top of the diversion (elevation 4,310 feet).

1. One bottom sluice would be closed entirely and the other partially closed to maintain the 13 cfs MIF.

2. When the diversion pool fills to its operational level at an elevation of 4,310 feet, the intake gates would be opened allowing water to enter the control structure. The juvenile fish bypass pipe within the control structure would be open. The open bottom sluice at the dam would be adjusted (closed slightly) to account for flow passing through the fish bypass pipe contributing to the MIF releases.
3. The turbine nozzles at the powerhouse would then start to be opened in accordance with ramping rates (further explained in Table 2–1, below) to allow flow above the MIF to be diverted into the diversion pipe and penstock to generate electricity.
4. The system would operate automatically in this mode until the upstream flow exceeds 118 cfs (maximum diversion to the powerhouse of 105 cfs plus MIF of 13 cfs as measured by the instream flow monitor at the diversion dam and the flow monitor at the powerhouse/tailrace). At this time, one of the bottom sluice gates would open automatically to allow flow over 118 cfs to pass downstream. As inflow increases, a second bottom sluice gate would be opened to maintain diversion pool elevation. Finally, depending on flow rate and volume passing through the bottom sluicing gates, the pneumatic gate(s) would be dynamically lowered down incrementally to pass higher inflow in order to maintain the WSL in the diversion pool as near to elevation 4,310 feet as possible.
5. The bottom sluice gates, pneumatic gates, and turbine nozzles would be operated dynamically and automatically to maintain the MIF, ramping rates, and the diversion pool elevation. The amount of flow through sluice and pneumatic gates and turbine nozzles would be computer–controlled with battery back–up. The control system would be designed with redundant back–up components and integrated programmed safety alarms to instantaneously modify and control the system to assure compliance with MIF and ramping rates. In the event of any Proposed Project component failure, all valves and gates can be over–ridden and manually controlled by trained plant personnel to maintain compliance. In case of emergency, personnel are planned to be dispatched to the site within approximately 1 hour.
6. When the natural inflow exceeds 418 cfs, the plant would begin its pre–programmed shutdown procedure with turbine nozzles timed to close in compliance with the required ramping rate. As inflow increases in conjunction with the timing of the turbine nozzle closing, the pneumatic gate would continue to be lowered (opened). Depending on inflow, the pneumatic gates may be in a fully opened position to allow high flows to pass through the diversion dam. The pneumatic gates in their open (lowered) position are engineered and constructed with steel plates on the flow side to withstand the pass–through of sediment, rocks, and woody debris without damage.
7. Once flows recede below 418 cfs, steps 1–6 as noted above would be repeated with the modifications that the raising of the pneumatic gates and diversion for power generation would be incremental to comply with ramping rate requirements.

Table 2–1. Proposed Bypass Flows and Associated Ramping Rates under Various Operational Scenarios

Hydro Limb	Inflow to Proposed Project	Proposed Project Operation	Bypass Flow	Change in Flow in Bypass	Typical Season of Occurrence	Conditions Resulting in Change in Flow
Climbing	0 to 17 cfs	Not operating	0 to 17 cfs	Natural increase	August to November	
Climbing	18 cfs	Start operation	13 cfs	1 inch/hour decrease	August to November	These conditions would result in changing flow releases into the bypass reach.
Climbing	19 to 118 cfs	Increase operation from 5 cfs to 105 cfs in powerhouse	13 cfs	0	August to June	
Climbing	119 to 418 cfs	Maxed out at 105 cfs	13 to 313 cfs	Natural increase	November to June	
Climbing	greater than 418 cfs	Cease operating, 105 cfs powerhouse flows transferred to bypass reach	greater than 418 cfs	Increase 1 inch/hour or natural increase; whichever is faster, as bypass flow increases from 313 cfs to 418 cfs	December to Early May	These conditions would result in changing flow releases into the bypass reach.
Climbing	greater than 418 cfs	Not operating	greater than 418 cfs	Natural increase	December to Early May	
Falling	greater than 418 to 418 cfs	Not operating	greater than 418 to 418 cfs	Natural decrease	December to Early May	
Falling	418 cfs	Start operating, 105 cfs transferred from bypass to powerhouse	313 cfs	1 inch/hour decrease	December to Early May	These conditions would result in changing flow releases into the bypass reach.
Falling	417 to 118 cfs	Maxed out at 105 cfs	312 to 13 cfs	Natural decrease	November to June	

Hydro Limb	Inflow to Proposed Project	Proposed Project Operation	Bypass Flow	Change in Flow in Bypass	Typical Season of Occurrence	Conditions Resulting in Change in Flow
Falling	117 to 19 cfs	Operating at decreasing capacity 104 to 5 cfs	13 cfs	0	August to June	
Falling	18 cfs	Stop operation, 5 cfs transferred from powerhouse to bypass	13 to 18 cfs	1 inch/hour increase	August to November	These conditions would result in changing flow releases into the bypass reach.
Falling	17 to 0 cfs	Not operating	17 to 0 cfs	Natural decrease	August to November	

Source: FERC 2018

2.3.3 Construction

2.3.3.1 Construction Sequencing

The predominant on–site construction activities, and any work requiring excavation or grading, would take place in the later spring, summer, and early fall, between approximately April 15 and October 15. In addition, on–site work on the turbine/generator and electrical and transmission systems may be year–round, but the majority of the site work would be accomplished in the April 15 to October 15 period. Construction is proposed to occur between 7 AM and 7 PM Monday through Friday.

1. The initial construction activity would be the mobilization of construction equipment, personnel, and staging of materials for clearing, grubbing, grading, surface preparation of construction and multi–purpose areas and access roads.
2. After the roads to the diversion and powerhouse areas are upgraded (existing roads) or constructed (new roads), construction would commence on the powerhouse foundation.
3. Concurrent with construction of diversion and powerhouse roads, clearing, grubbing, grading, excavation, and placement of the HDPE pipeline and steel penstock would commence, working from the top down (from the intake to the west) and from the bottom up (from the powerhouse to the east).
4. Powerline ROW clearing and grubbing would commence. Upon completion of ROW preparation, individual pole and tower sites would be prepared. Upon completion of pole and tower sites, built–up poles would be delivered and placed. The electrical conductors would then be placed, tensioned, and secured on the poles and terminated at the substation and switchyard.
5. Substation and switchyard components would be installed.
6. Construction of diversion, intake, and control structures and the tailrace would take place during periods of lowest stream flow, which typically occurs from August through September
7. Installation of powerhouse rotating equipment would occur after the powerhouse foundation has cured sufficiently to receive the equipment. After placement of the rotating machinery, the powerhouse structure would be completed to a weather–tight condition and subsequent powerhouse equipment would be installed.
8. Upon completion of installation of all powerhouse components, testing of system components would begin.
9. After testing and acceptance, the plant would go into commercial operation.

2.3.3.2 General Construction Activities

Construction of the Proposed Project would include the following activities at most Proposed Project facilities locations:

- Delineation (by staking and flagging) of work and avoidance areas.
- Mobilization of construction equipment, personnel, and materials for clearing, grubbing, grading, and surface preparation of construction and multi–purpose areas.
- Installation of erosion and sediment control structures (e.g., silt fence) in compliance with the Proposed Project Storm Water Pollution Prevention Plan (SWPPP).
- Preparation of multi–purpose areas.
- Clearing and grubbing of vegetation and debris within the limits of construction and ROW easement areas as shown on the construction plans or as designated by the engineer. Vegetation and debris would be removed and disposed of on–site away from the influence of the stream. This work also includes preserving (from injury and defacement) vegetation and objects designated to be protected and remain in place.
- Grading and surface preparation of roads for access to Proposed Project facilities. Most roads that will be used by the Proposed Project are existing logging roads. New roads would be constructed to access the diversion works and powerhouse.
- Excavating, forming, and placement of concrete foundation and other facilities. Foundations would be required for the powerhouse, substation, switchyard, transition structure, diversion dam, intake structure, and control/fish screen structure.
- Backfilling, clean up, and revegetation of temporarily disturbed areas.

2.3.3.3 Construction Traffic

During Proposed Project construction, traffic would occur daily throughout the construction season (e.g., construction crew carpools of three to six crew members each), and some road use would be frequent during this relatively short time. Construction vehicles, such as concrete transit mixer deliveries, concrete pump placement equipment, or dump trucks hauling overburden material, may require frequent travel across access roads. Other construction vehicles, such as flatbed trucks delivering construction equipment or materials (e.g., pipeline and penstock material, electrical switchgear, hydroelectric turbines and generators), would require vehicle trips. Construction vehicle types and estimated number of vehicle trips for Proposed Project construction activities are summarized in Table 2–2 and all Proposed Project access roads are shown on Figure 2–1.

2.3.3.4 In–Water Construction

The general in–water work window for South Fork Battle Creek is from July 1 to October 15. Extensions of this work window may be allowed based on rain forecasts in consultation with appropriate resource agencies. The primary in–water work elements proposed are the diversion dam, intake, and control/fish screen structure concrete foundation and floor slab installations.

2.3.3.5 Staging and Storage Sites for Construction and for Operations and Maintenance

Four multi–purpose areas include construction yards; storage areas; staging areas; and helicopter landing and staging sites. Multi–purpose areas would vary in size from 10,000 square feet (SF) to one acre and be located within previously disturbed areas (e.g., log landings) on private lands. The four multi–purpose areas include:

- construction yard near the diversion dam (Multi–purpose Area #1);
- construction yard near the powerhouse (Multi–purpose Area #3);
- multi–purpose area near the Old Highway 36 Bridge that would also serve as the helicopter landing site (Multi–purpose Area #2); and
- multi–purpose area toward the west end of the Proposed Project to support transmission line construction (Multi–purpose Area #4).

2.3.3.6 Helicopter Use

A helicopter would be used to assist in the installation of electric transmission line poles at select pole locations too difficult to reach by road and to install conductors on the transmission line. It is expected that no more than one helicopter would be in use at any one time. Helicopter operations would occur during the typical construction season, commencing in the spring and ending in late fall.

2.3.3.7 Construction Details by Facility

Diversion Dam, Intake, and Control/Fish Screen Structures

The footing excavation for the diversion dam, intake, and control structures would be constructed in two sections. Footing for the southern section of the diversion dam, intake, and control/fish screen structure would be completed first in the dry portion of the streambed during low stream flow periods. This work would consist of excavating the streambed and southern bank to construct the diversion dam (approximately 125 cubic yards [CY] of excavated soil) and pouring in place the concrete footings (approximately 35 CY of concrete footings). Rocks removed for the footings would be restacked on the either side of the diversion dam once completed. Excavation for the control/fish screen structure would require removal of approximately 400 CY of soil. The footing and floor area would be formed and poured in place on site (approximately 40 CY of concrete).

Once the southern portion is complete, the stream would be diverted through the diversion area dewatering pipe at invert elevation 4,304 feet to maintain its natural flow. Then the northern section of the diversion dam footings would be excavated (approximately 40 CY) and the concrete footings poured in place (approximately 20 CY). After both sections of the footings are complete, precast concrete elements cured off–site would be brought to the site and installed for the diversion dam, buttresses, intake, and control structure walls. These structures would be attached to the cast–in–place concrete floor and to each other. Valves, piping, and screens would be attached to the intake and control structure walls.

The northern and southern diversion dam abutments that meet with the hill slopes and the intake and control structures would be backfilled to meet existing established finished grades

(approximately 400 CY). Upon completion of all of the Proposed Project elements, the diversion area dewatering pipe would be closed and the pool (impound) behind the diversion dam would form.

For the diversion dam, intake, and control/fish screen structure construction and associated piping, as described above, there would be a total of approximately 565 CY of excavation, 95 CY of poured in–place concrete to be cured on–site and 400 CY of backfill to match up to existing established finished grades. The construction depth would vary from 2 feet to a maximum of 8 feet.

Table 2–2. Proposed Project Areas and Proposed Project Vehicles and Access Road Travel/Trips during Construction

Proposed Project Area	Compactor/ Roller Number of Trips	Dozer Number of Trips	Equipment Maintenance Vehicles Number of Trips	Excavator Number of Trips	Trash Racks Number of Trips	Haul/Dump Truck Number of Trips	Loaders Number of Trips	Motor Grader Number of Trips	Off–Road Drill Unit (Trailered) Number of Trips	Off–Road Forklift Number of Trips	Pickup Truck Number of Trips	Skidder Number of Trips	Utility Truck Number of Trips	Water Truck Number of Trips	Total Number of Trips
Substation/Point of Connection															
Access Road SPR	0	0	0	0	0	0	0	0	2	0	8	0	2	0	12
Access Road MSR	0	0	0	0	0	0	0	0	0	0	4	0	2	0	6
Access Road HR	0	0	0	0	0	0	0	0	0	0	4	0	2	0	6
Subtotals	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**16**	**0**	**6**	**0**	**24**
Transmission Line										0					
Access Road R–4	0	0	0	0	0	0	0	0	2	0	8	2	2	0	14
Access Road R–6	0	0	0	0	0	0	0	0	2	0	4	2	2	0	10
Access Road MSR	0	0	0	0	0	0	0	0	0	0	4	0	2	0	6
Access Road HR	0	0	0	0	0	0	0	0	0	0	4	0	2	0	6
Access Road PW	0	0	0	0	0	0	0	0	2	0	8	2	2	0	14
Subtotals	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**6**	**0**	**28**	**6**	**10**	**0**	**50**
Transmission Line										**0**					
Access Road 200ca	0	2	0	0	0	0	0	0	2	0	8	2	2	0	16
Access Road R–1	0	0	0	0	0	0	0	0	2	0	4	0	0	0	6
Access Road R–2	0	0	0	0	0	0	0	0	2	0	4	0	0	0	6
Access Road R–3	0	0	0	0	0	0	0	0	2	0	4	2	0	0	8
Access Road PW	0	0	0	0	0	0	0	0	2	0	6	0	0	0	8
Subtotals	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**10**	**0**	**26**	**4**	**2**	**0**	**44**
Transmission Line										0					
Access Road A–Line	0	2	0	0	0	0	0	0	2	0	8	2	6	0	20
Access Road C–Line	0	4	0	0	0	0	0	0	4	0	8	4	6	0	26
Access Road 180c	0	2	0	0	0	0	0	0	2	0	8	2	2	0	16
Access Road 190c	0	2	0	0	0	0	0	0	2	0	8	2	2	0	16
Access Road 190c	0	2	0	0	0	0	0	0	2	0	8	2	2	0	16
Subtotals	**0**	**12**	**0**	**0**	**0**	**0**	**0**	**0**	**12**	**0**	**40**	**12**	**18**	**0**	**94**

Proposed Project Area	Compactor/ Roller Number of Trips	Dozer Number of Trips	Equipment Maintenance Vehicles Number of Trips	Excavator Number of Trips	Trash Racks Number of Trips	Haul/Dump Truck Number of Trips	Loaders Number of Trips	Motor Grader Number of Trips	Off–Road Drill Unit (Trailered) Number of Trips	Off–Road Forklift Number of Trips	Pickup Truck Number of Trips	Skidder Number of Trips	Utility Truck Number of Trips	Water Truck Number of Trips	Total Number of Trips
Powerhouse[a]															
Access Road 100A	2	6	36	14	2	8	12	6	0	2	300	2	0	36	426
Access Road 110A	2	4	20	10	0	16	30	10	0	2	150	2	0	30	276
Access Road 120A	2	4	20	16	2	16	18	20	0	2	200	4	0	120	424
Access Road 120A7	10	4	20	16	2	34	50	8	0	2	100	2	0	30	278
Subtotals	**16**	**18**	**96**	**56**	**6**	**74**	**110**	**44**	**0**	**8**	**750**	**10**	**0**	**216**	**1404**

Source: Tetra Tech HPMP Vol. I, 2015

a. This area includes the diversion, pipeline, penstock, and transition structure.

Notes: MSR – Manton School Road–surfaced
PW – Ponderosa Way–gravel surfaced and regularly and well–travelled
R – Road–surfaced
SPR – South Powerhouse Road–surfaced

HDPE Pipeline and Penstock

The 40–foot–wide pipeline and penstock corridor would be cleared and graded to establish access for excavating equipment. The 48–inch diameter HDPE pipeline trench (approximately 7,565 feet), which starts at the control/fish screen structure and terminates at the transition structure, would be excavated to finished invert grade in segments of approximately 500 to 1,000 feet (total of 21,560 CY excavated and backfilled). The construction depth would vary from 6 feet to a maximum of 20 feet. The HDPE pipeline joints would be seam welded together to create 500 to 1,000–foot pipe units as appropriate. Pipe units would be positioned in the excavated trench and attached to adjacent pipe units by seam welded bolted steel flanges. Placed pipe units would then be backfilled and graded to meet existing finished grades.

The 36–inch diameter steel penstock starts at the transition structure and continues downslope to the powerhouse approximately 1 mile (5,230 feet) away. The steel pipeline trench would be excavated to finished invert grade (total of 10,460 CY excavated and backfilled). The pipe units would be welded together at the joints and x–rayed to inspect that the welds are secure and acceptable before being placed into the trench. Welded pipeline segments would then be placed into the trench and backfilled to match established existing finished grade. Excess excavated soil from excavation of the trench would be utilized as appropriate for road base over the pipeline excavation. If there is yet still excess, it would be spread on site at the multi–purpose site(s) and be seeded with native vegetation. Further, the perimeter of that excess material would be protected from run–off and sediment load generation by using proper Storm Water Pollution Protection (SWPPP) methods until each site is fully stabilized by the added vegetation.

Powerhouse and Tailrace

The powerhouse access road, powerhouse, and tailrace areas would be cleared and graded (estimated 16,800 CY of excavation/cut) and 1,650 CY of engineered and compacted soil fill would be incorporated into the powerhouse road extension (approximately 10,000 square feet) and powerhouse foundation site. The construction depth would vary from 2 feet to a maximum of 16 feet. The powerhouse foundation would be formed and approximately 200 CY of reinforced concrete would be poured to form the base for the turbine, generator, and thrust blocks for the penstock transition to the turbine. The tailrace culvert would be placed in the excavated tailrace channel and then backfilled to match existing established finished grades (approximately 175 CY of backfill).

Substation

Construction of the substation would require clearing and grading of a 50–by–51–foot area. A 12–by–12–foot concrete pad would be installed to support the transformer. This would be surrounded by a 20–by–4–by–2–foot deep concrete floor and wall oil containment pit filled with gravel to bring the surface back up to grade elevation. The construction depth would vary from 1 foot to a maximum of 6 feet. A 3–pole wooden H–frame structure would be installed to convey electricity on overhead power lines from the transformer, which would be fed by Proposed Project–generated power via cables in underground conduit from the powerhouse, to the 60 kV transmission line that leads to the POI in Manton. The wooden H—frame structure would be installed as described below for transmission and station service line structures. The substation

would be surfaced with gravel and surrounded by an 8–foot–tall security fence with two locking gates.

Transmission and Powerlines

The installation of the transmission and powerline poles would require augured holes up to 8 feet deep and approximately 12 inches in diameter. Each hole augured for pole construction would result in less than 1 CY of soil disturbance per single pole set. Each pole would be erected into its respective hole and then backfilled for a snug installation. Most of the poles can be accessed on existing timber roads maintained by the landowner and would be set with conventional ground crews using auger trucks and pole trailers. In locations where the pole sets cannot be accomplished with conventional ground crews and equipment, helicopter aerial installations would be used. For long–span locations where composite transmission 'H' towers are utilized, in lieu of the typical single wooden pole to be used on most of the transmission line, three poles would be used at each location with three augured holes and less than 3 CY of soil disturbance.

Tower sites would require a 60–by–40–foot workspace, while poles would require an 8–by–8–foot workspace. During construction, temporary transmission line pulling sites for utilization of tensioning equipment would be located approximately 10,000 feet apart. Pulling sites would be 50–by–100 feet and may occur outside the ROW easements. Conductor installation and pulling would be performed by conventional ground crews with conductor reels and pulling equipment trucks and trailers. In locations where the conductor installation and pulling cannot be accomplished with conventional ground crews and equipment, helicopter aerial installations would be used.

Switchyard

Construction of the switchyard would require minimal clearing and grading of an approximate 40–by–35–foot area. A 10–by–10–foot foundation requiring excavation of up to 2 feet below the ground surface would be formed and poured on site in the southeast corner of the switchyard for the metering and protection building constructed out of concrete block walls. Two wooden H–frame structures would be installed within the switchyard: one on the east side where the 60–kV transmission line enters the area, and one on the west side towards the POI. An aerial 12–kV power line would be constructed to provide electrical and telephone service to the switchyard building from an existing PG&E distribution line adjacent to the POI. The 12–kV single composite pole line and H–frame structures would be installed as described above for the Proposed Project powerlines and transmission structures.

*2.3.3.8 Routine Facility Inspections, Testing, and Maint***enance**

Operational inspections would focus on the continued safety of the structures, identification of unauthorized modifications, efficiency and safety of operations, compliance with the terms of the license, and proper maintenance. Specific activities are described below.

Powerhouse Inspection, Testing, and Maintenance

Equipment maintenance would take place annually during a 2– to 4–week period in the late summer and/or fall when the Proposed Project is not in operation. Routine maintenance, such as maintaining fluid and lubricant levels, lighting fixtures, and maintenance of roads, would be

the responsibility of the staff maintenance crew. Maintenance of the rotating equipment, valves, switchgear, high–voltage components, computer controls, and monitoring systems would be conducted by qualified personnel of the equipment providers. Planned maintenance activities would be performed predominately when the Proposed Project is not operating during the annual Proposed Project shut–down time frame, which would typically occur between July and November.

Sensors at the control/fish screen structure and the powerhouse would continually monitor operating parameters. In the event of unanticipated pipeline rupture, inflow into the structure would be stopped by closing the automated sluice gate located at the inlet to the structure. The automated sluice gate would also be programmed to close at a rate compliant with the required ramping rates, maintaining the water surface level in the structure during normal maintenance and/or dewatering scenarios.

Vegetation Management

The transmission line, service station line, and pipeline/penstock ROWs would require regular vegetation management activities as described in the Proposed Project's Noxious Weed and Revegetation Management Plan document (Tetra Tech, 2014) to ensure the safe operation and reliability of the Proposed Project. Rugraw would maintain minimum clearance distances from conductors to prevent fires and outages that could be caused by trees or vegetation damaging the lines. Deep–rooting vegetation would not be allowed to establish above the buried pipeline/penstock to prevent structural damage or failures from large roots. Vegetation management inspections would be conducted on an annual basis. Vegetation clearing, via mechanical means, manual means, and/or herbicide application, would be conducted every other year, or more often as may be desired or required. Dangerous tree removal shall be conducted as needed to maintain reliability of the Proposed Project.

Pest Management

Pest Management would occur seasonally and as often as monthly if required to deter rodents and insect nests from project facilities (e.g., POI switching shed, powerhouse, intake and screen structure). Pesticides would be applied by a licensed Pest Control contractor utilizing methods and/or pesticides approved for use by the State of California and monitored by Proposed Project operations personnel.

Sediment and Sluicing Management

Sluicing operations would be completed in a manner that would not increase sediment deposition above background levels and in compliance with State Water Board and CDFW requirements (further discussed in Section 2.3.5.4).

A sluice gate located within the control/screen structure would automatically block water flowing into the pipeline in the unlikely event of penstock rupture. Pressure–differential, water level, and velocity sensors would be installed to sense any anomaly indicating a rupture in the penstock.

Woody Debris Management

Woody debris accumulated on the intake structure trash rack would be manually removed and disposed of in the stream channel below the diversion dam where it can move downstream

during high flows. Typically, during high flows, the pneumatic gates would be lowered and woody debris would pass through the dam into the stream channel below. If the pneumatic gates are up during high flows, woody debris that approaches the diversion dam would pass over the dam into the stream channel below. Depending on the quantity of woody debris, Rugraw may pass woody debris and sluice sediment concurrently by lowering the pneumatic gates. Woody debris longer than 48 feet (the width of the operable gates) may need to be cut into pieces to pass through the opening of the pneumatic gates.

Facility Maintenance

Routine facility maintenance (e.g., minor repairs, touchup painting, etc.) would be provided by qualified operational personnel. If a situation arises which is beyond the scope of operational personnel, a licensed contractor would be employed to provide assistance.

Pole Replacement

Upgrade or replacement of transmission poles and/or appurtenant equipment would be provided by a contractor licensed to perform such duties. Existing logging roads would be used to access pole replacement sites. If a pole replacement site is not accessible, a helicopter would be used.

Road Maintenance

The existing landowner maintains the primary access roads that would be used by the Proposed Project, as a part of their ongoing timber operations. Rugraw is responsible for maintaining Proposed Project–specific access roads, including any required for construction and the two new permanent road extensions required to access Proposed Project facilities. Routine inspection and maintenance of roads and drainage facilities, including grading of gravel access roads, would be performed by qualified on–site personnel. Events and/or situations which are beyond the scope of routine maintenance, including culvert installation and maintenance and more substantial grading, would be performed by a contractor licensed to perform road maintenance work.

2.3.4 Rugraw–Proposed Measures

As a result of consultation with state and federal agencies during the FERC licensing process, Rugraw has agreed to implement construction and operational measures to minimize potential environmental impacts as noted in this section below. In addition, Chapter 4, Environmental Analysis, includes a discussion and analysis of potential Proposed Project impacts and provides a determination of whether additional mitigation is required to minimize significant environmental impacts.

2.3.4.1 General Construction Measures

1. Develop a construction plan to be filed for FERC approval prior to the start of ground–disturbing activities. This construction plan should also be closely coordinated with the SWPPP.
2. Limit land disturbance and vegetation clearing to those areas needed for construction. Delineate the limits of construction, work areas, and multipurpose areas with flagging, fencing, and/or stakes to prevent land–disturbing activities outside of construction areas.

3. Stockpile natural topsoils and replace, regrade, and revegetate disturbed areas, in accordance with California forestry regulations and best practices[8], with native vegetation. Restore disturbed stream and riparian habitat to pre–construction conditions using riparian plantings and/or seeding, where applicable, with seed mixes recommended by CDFW.
4. Develop a SWPPP with measures to prevent storm–induced erosion and sedimentation during ground–disturbing construction activities, including:

(A) Store spoils from Project construction in areas that limit erosion of spoil material and prevent runoff into aquatic habitats.

(B) Install cofferdams, silt fences, or other structures to isolate in–water work areas and only use washed riprap, rocks, and gravel adjacent to or in watercourses.

5. Use existing roads to the maximum possible extent, constructing new access roads only when necessary; limit access roads to a width of 12 feet whenever possible; and surface permanent roads with gravel to a depth and quantity sufficient to maintain a stable road surface and minimize erosion and dust.
6. Conduct in–water work activities between July 1 and October 15 when streamflows are low to protect water quality and aquatic resources.

2.3.4.2 Biological Resources Protection Measures

1. Maintain upstream and downstream fish passage at the Project during construction by constructing the diversion dam in phases or by providing a temporary diversion culvert to allow fish to pass the site.
2. Conduct monitoring during construction to ensure that measures to protect biological resources are implemented appropriately, using staff trained in the identification of special–status species and their habitats.
3. Provide environmental training to construction staff, and implement Best Management Practices (BMP) (as provided below in Sections 2.3.4.3, 2.3.4.4, and 2.3.4.6) to protect threatened and endangered species and special–status plant species and their habitats.
4. Conduct pre–construction inspections of all areas of suitable habitat for threatened and endangered and special–status plant species where surveys have not previously been conducted, and implement specified protection measures as necessary.
5. Avoid streams, wetlands, and pond habitats to the extent possible during construction, and use existing stream and wetland crossings where possible.
6. Monitor fish behavior at the Project tailrace and modify the tailrace if fish attraction is observed.
7. Avoid ground–disturbing activity on or near talus slopes to protect Sierra Nevada red fox and American pika.

[8] California forestry regulations and BMPs can be found in the Board of Forestry and Fire Protection's Forest Practice Rules and Fire Protection System (CAL FIRE 2020).

8. Avoid construction activity within or near potential bat roosting habitat, including rock crevices, cliffs, and snags. Incorporate this and other construction–specific measures into a construction plan for FERC approval.
9. Map, evaluate, and quantify, by vegetation type, the vegetation that would be removed as a result of Proposed Project construction.

2.3.4.3 Raptors and Migratory Bird Measures

1. Conduct pre–construction surveys for migratory bird nests within 100 feet of any areas that would be disturbed during the typical nesting season from April 15 to July 31 to identify nest locations and their status.
2. Restrict construction activities within 100 feet of any active migratory bird nests found during the pre–construction surveys.
3. Conduct pre–construction raptor nest surveys in suitable habitat within 1 mile of any areas that would be disturbed during the appropriate nesting time periods (January through August) to identify nest locations and their status.
4. Determine in consultation with CDFW and apply an appropriate buffer for restricting construction activities around any active raptor nests found during pre–construction.

2.3.4.4 Amphibian Protection Measures

1. Conduct surveys for all life stages (egg masses, larvae, juveniles, and adults) of FYLF, Cascades frog, and CRLF immediately prior to construction when in–water work would occur and relocate juvenile and adult frogs found within the Project reach and up to 500 feet downstream, outside the Project construction area. Incorporate these measures into the staff–recommended special–status amphibian protection plan.
2. Avoid construction activities in riparian areas during the time that egg masses of FYLF are present (typically mid–April through mid–May); postpone construction around the immediate area where egg masses of FYLF, Cascades frog, and CRLF are found until the eggs have hatched; avoid collection of rocks from in–water environments and minimize disturbance to pools and shallow runs between March 1 and August 31 to protect FYLF and their habitat.
3. Develop a CRLF protection plan to allow CRLF to become reestablished in the Project area and to be protected from manageable threats during construction**.** Incorporate the plan into the staff–recommended Special–Status Amphibian Protection Plan discussed below.

2.3.4.5 Visual Quality Measures

1. Reduce visual contrast where over–story vegetation is removed by thinning and removing trees from the edge of the ROW to give a natural appearance, where possible.
2. Use composite poles as recommended for fire safety for wildland transmission lines to support the Project transmission line to blend with surrounding vegetation.

2.3.4.6 Special–Status Habitat/Vegetation Measures

1. Conduct pre–construction inspections for slender Orcutt grass, elderberry, and vernal pool habitat in areas of proposed disturbance not previously surveyed in 2013.
2. Adjust the transmission line design to avoid any areas where these species or habitats are found.

2.3.5 Other Environmental Management and Monitoring Plans

Through a collaborative effort with FERC, applicable state and federal agencies, and the public, Rugraw is required to develop and implement several resource management plans. These agreed upon plans are required to be completed within a specified period of time following FERC license issuance.

Rugraw filed three resource management plans with the Final License Application. The remaining resource management plans must be developed with and approved by the appropriate agencies, as described in Section 2.3.5.4. The existing plans – the Anadromous Fish Monitoring Program, Noxious Weed Management and Revegetation Plan, and the Draft HPMP and Programmatic Agreement – are described below.

2.3.5.1 Anadromous Fish Monitoring Program

The Proposed Project would be located above the Battle Creek Salmon and Steelhead Restoration Project (BCSSRP), which aims to restore salmon and steelhead habitat in Battle Creek by modifying flows, removing select dams, and constructing fish passage structures. Although the existing dams preclude anadromous fish presence in the Proposed Project area at this time, it is possible that the BCSSRP will be completed and anadromous fish would have access to the Proposed Project area within the term of the license. Rugraw developed the Anadromous Fish Monitoring Program in consultation with CDFW and NMFS to monitor for anadromous fish presence in the Proposed Project area following BCSSRP completion.

NMFS has determined that with implementation of an Anadromous Fish Monitoring Program, operation of the Proposed Project "may affect, but [is] not likely to adversely affect" the California Central Valley steelhead distinct population segment and Central Valley spring–run Chinook salmon evolutionarily significant unit or their critical habitats (NMFS, 2019).

The Anadromous Fish Monitoring Program would be implemented in Subreach 1 of the Proposed Project's 2.4 RM bypass reach. Subreach 1 is from the proposed powerhouse tailrace (RM 20.6) 1.7 miles upstream to Angel Falls (RM 22.3), which is the potential limit of anadromy and designated critical habitat for steelhead at 40.3531 latitude, –121.6682 longitude. The designated critical habitat for spring–run Chinook salmon is up to 40.3549 latitude, –121.6861 longitude (RM 21.3), 0.7 RM above the proposed powerhouse tailrace and 1.0 RM downstream of Angel Falls. Subreach 2 is from Angel Falls (RM 22.3) 0.7 mile upstream to the proposed diversion (RM 23.0).

Snorkel Survey

Upon License issuance and upon specific criteria being met (as noted below), Rugraw would conduct snorkel surveys within Subreach 1. All Resource Agencies would be invited to participate on these surveys.

Snorkeling Trigger

Rugraw would follow a monitoring protocol to trigger when the snorkel surveys would be scheduled in Subreach 1 and the trigger would be based upon the following two criteria:

- After the BCSSRP renovations are completed and anadromous fish are detected at the uppermost monitoring station of the BCSSRP; and
- There is a high flow over Angel Falls with a magnitude equal to a 2.5–year return interval (calculated with at least a 20–year flow record), as measured at a flow gage located upstream of Spring Number 4.

Snorkeling Timing

If the snorkeling trigger is met between November 1 and May 31, Rugraw would schedule and conduct a snorkel survey in Subreach 1 no more than 2 weeks after the 2.5–year high flow event. If flows remain too high for safe snorkeling in that subsequent 2–week period, snorkeling would be completed at the next earliest opportunity that safe conditions exist.

Survey Results

Rugraw would provide snorkel survey results to the Resource Agencies and FERC within 1 calendar week of completion. If anadromous salmonid(s) are detected in Subreach 1, then Rugraw would notify NMFS as soon as possible and the following would occur:

- Rugraw would provide a Pulse Flow into Subreach 1 as described below;
- Rugraw would provide NMFS with Biological Assessment(s) (BA) for anadromous salmonid(s) listed under the Endangered Species Act within 30 days of detecting anadromous salmonid(s); and
- Upon NMFS' review of the BA(s) and through informal consultation with Rugraw and FERC, NMFS would assess and determine the following:
  - If the Project's operations are or are not adversely affecting anadromous salmonid(s);
  - What actions would Rugraw do to mitigate for the Proposed Project's adverse effects, if that has been determined; and
  - If amendments to the License are necessary.

Anadromous Fish Pulse Flows

If the Anadromous Fish Monitoring Program detects anadromous fish in Subreach 1 between November 1 and April 1:

- Rugraw would notify NMFS as soon as possible; and
- Rugraw would, within one calendar week of such a detection, release a 48–hour, 30 cfs, pulse flow into Subreach 1 (unless a 48–hour, 30 cfs, flow has occurred during the previous 2 calendar weeks), and then every 4 weeks (between November 1 and May 31).

2.3.5.2 Noxious Weed Management and Revegetation Plan

The Noxious Weed Management and Revegetation Plan (Tetra Tech, 2014) includes measures to ensure weeds and non–native invasive vegetation do not reestablish at onsite disposal areas during Proposed Project construction, with modifications. The modifications include provisions for riparian plantings along disturbed portions of South Fork Battle Creek to provide overhanging vegetation, monitoring of restoration success, criteria for additional reseeding if by the end of a 2–year monitoring period the criteria are not met, preconstruction treatment of existing non–native invasive plant populations on Proposed Project lands, and measures to protect rare plant species from control measures targeting noxious weed species.

2.3.5.3 Historic Properties Management Plan and Final Programmatic Agreement

Historic Properties Management Plan

In November 2015, Rugraw filed a Revised Historic Properties Management Plan (HPMP) to address current and future Proposed Project–related effects on eligible or potentially eligible cultural resources within Proposed Project's area of potential effects (APE). The APE for the Proposed Project includes land within the Proposed Project boundary, plus land outside the boundary where Proposed Project operations may affect the character or use of historic properties or Traditional Cultural Properties (TCPs). The purpose of the HPMP is to provide specific requirements that would avoid, reduce, or mitigate cultural resources impacts.

The HPMP includes the following topics that would guide Rugraw in applying both general and site–specific treatment measures:

- Confidentiality
- General and site–specific treatment measures designed to address effects to historic properties that may be a result of the Proposed Project's construction, operation, and maintenance
- A process of consultation with appropriate state and federal agencies, participating tribes, and stakeholders
- A plan for public interpretation and education
- Procedures that will be implemented in the case of inadvertent discoveries
- Procedures that will be implemented in the case of emergency situations
- Procedures for the treatment of human remains
- A process for HPMP review and revision (as necessary)

As stated in FERC's Final EIS (Section 5.1.2, Additional Measures Recommended by Staff, page 214), the Proposed Project includes finalizing the HPMP, to include both the California Office of Historic Preservation's State Historic Preservation Officer (SHPO) and FERC staff comments and recommendations. Revisions to the HPMP would include: (1) modifying specific sections, and appendix B of the document for a more clear and concise management approach for historic properties that may be affected by the Proposed Project; (2) copies of any post–2014 tribal correspondence and consultation related to the identification of cultural resources and development of the HPMP to document full compliance with Section 106; (3) a cultural resources interpretive element, such as installation of public interpretive signs at key viewing

areas; (4) a detailed monitoring plan for cultural resources within the APE that are eligible for listing in the National Register or have not yet been evaluated; (5) provisions for periodic review and revision of the HPMP; (6) editorial corrections as specified in of the EIS; and (7) inclusion of Volume II into the final HPMP.

The HPMP acknowledges that future changes to specific site treatments may be required and that consultation at such times with FERC, California SHPO, Native American tribes, and others, as appropriate, would be necessary.

Programmatic Agreement

On July 10, 2019, FERC and SHPO approved the Final Programmatic Agreement (PA) for the Proposed Project. The PA identifies specific stipulations that must be implemented by Rugraw as a condition of issuing a new license for the Proposed Project (FERC, 2019). Most importantly, these include:

- Revise the current HPMP in consultation with California SHPO, Native American tribes, and others, as appropriate, within one year of license issuance;
- Procedures to amend the PA; and
- Coordination with other federal agency reviews.

2.3.5.4 Additional Environmental Management Plans

As provided in the FLA, Rugraw has agreed to develop and implement, in consultation with resource agencies, the following environmental management plans, which are described in detail below:

- Operation Compliance Monitoring and Reporting Plan
- Water Temperature Monitoring Plan
- Special–Status Amphibian Protection Plan
- Turbidity and pH Monitoring Plan
- Avian Protection Plan
- Aquatic and Invasive Species Monitoring Plan
- Bald Eagle and Raptor Management Plan
- Debris and Sediment Management Plan
- Erosion Control and Sedimentation

Project Operation Compliance Monitoring and Reporting Plan

A Project Operation Compliance Monitoring and Reporting Plan (Plan) is required to support and document compliance with run–of–river operation, MIF requirements, ramping rates, and water temperature protection measures. The Plan will specify: (1) real–time water temperature monitoring at the Proposed Project's Diversion Dam and in Subreach #1 upstream of Spring Number 4 influence; (2) monitoring of water surface elevation just downstream of the diversion dam and streamflow just upstream of Spring Number 4 influence; (3) water surface elevation

monitoring in the reservoir; (4) non–compliance event reporting; and (5) annual compliance reports.

As stated in FERC's Final EIS (Section 5.1.2 Additional Measures Recommended by Staff, page 214), the monitoring component of the Plan would articulate specific monitoring locations, equipment and station design, and methods. The reporting component of the Plan would: (1) specify that the licensee notify NMFS, USFWS, CDFW, and the State Water Board within 24 hours, and FERC within 10–days of a non–compliance event; and (2) include a provision for annual operation and compliance reports, which would document compliance with all license requirements for flow, ramping rates, and water temperature. The annual reports would also track and report other operational events such as project shut–down and start–up due to available flow, the turbidity monitoring results during sluicing operations, and results of the periodic monitoring of sediment and/or woody material accumulation.

Water Temperature Monitoring Plan

Within 1 year of license issuance and after consultation with the Resource Agencies (USFWS, NMFS, CDFW), Rugraw would file with FERC a Water Temperature Monitoring Plan (WTMP) that would designate Proposed Project water temperature loggers. The WTMP will include existing and new water temperature loggers that would be used to monitor instream water temperatures for the first 5–years of the license and 2 real–time temperature monitoring stations that would operate for the duration of the license. Water temperature loggers will be located from just upstream of the diversion dam to just downstream of Panther Grade. Specific required water temperature monitoring locations are:

- Just upstream of the diversion dam, for the first five years after license issuance;
- At the intake's header box at the Diversion Dam, recording what is being diverted into pipeline in real–time, for the duration of the license;
- Upstream: within 0.3 RM of Angel Falls, for the first five years after license issuance;
- Upstream of Spring Number 4, just downstream of Angel Falls (between Angel Falls and Spring Number 4), in real–time, for the duration of the license;
- At the powerhouse discharge (what the powerhouse is discharging), for first five years of license.
- Just downstream of the powerhouse (or just upstream of Panther Grade); for the first five years after license issuance.
- Downstream: within 0.3 RM of Panther Grade, for the first five years after license issuance.

Temperatures would be measured and recorded in a way that would facilitate determining compliance with the temperature criterion stated below. The WTMP would also describe the frequency and the means by which recorded temperature data would be made available for review by FERC and the Resource Agencies. Should the temperature criterion be exceeded, FERC and the Resource Agencies would be notified within 24 hours using the contact procedures developed in the WTMP.

The licensee would discontinue Project operation when the average daily stream temperature measured upstream of Spring Number 4's influence exceeds 20°C and is higher than the stream temperature measured at the Diversion Dam.

Special–Status Amphibian Protection Plan

A Special–status Amphibian Protection Plan (Amphibian Plan) must be developed in consultation with CDFW and USFWS that includes the following provisions to protect FYLF, Cascades frog, and CRLF: (1) conduct preconstruction surveys for all life stages during the breeding season; (2) stop work and notify USFWS within 24 hours if CRLF are observed during preconstruction surveys or during construction; (3) avoid construction activities when egg masses are present; (4) develop protocols for handling FYLF and Cascades frogs during relocation activities; (5) identify specific areas for relocation (notify CDFW if relocation of FYLF or Cascades frogs is necessary); and (6) relocate larval, juvenile, and adult FYLF and Cascades frogs prior to construction activities to an area sufficiently upstream to prevent them from re–entering the construction area.

To protect FYLF from spring base flow recession rates that could dewater egg masses the Amphibian Plan should include: (1) a protocol for distinguishing base flow recessions from storm pulse recessions; (2) measures to avoid a greater than 1–foot reduction in base flow over a 3–week period; and (3) annual reporting that provides the stage record from May 1 through July 31, and identifies periods where operations were modified, if necessary, to protect FYLF egg masses, or demonstrates that base flow stage reductions did not exceed the 1–foot per 3–week threshold.

Turbidity and pH Monitoring Plan

A Turbidity and pH Monitoring Plan would be developed to document and report to the Resource Agencies observations of oily sheens and turbidity plumes during Project construction.

Avian Protection Plan

As recommended by the Avian Power Line Interaction Committee (APLIC) Guidelines and USFWS Avian Protection Plan Guidelines, the transmission line would be designed and constructed to reduce the risk of avian interactions with the proposed transmission line (APLIC, 2006; 2012). The Avian Protection Plan would be implemented throughout the term of the license.

Aquatic and Invasive Species Monitoring Plan

The Aquatic and Invasive Species Monitoring Plan must be developed in consultation with the resource agencies that incorporates measures, including construction BMPs, to help prevent the introduction and/or spread of aquatic nuisance species into the Project area (e.g., bullfrog), and protocols to decontaminate equipment that could spread chytrid fungus.

Bald Eagle and Raptor Management Plan

The Bald Eagle and Raptor Management Plan must be developed using USFWS's National Bald Eagle Management Guidelines. The Bald Eagle and Raptor Management Plan, at a minimum, would include the use of species–specific distance buffers, landscape buffers, seasonal restrictions, and additional recommendations to benefit raptors.

Debris and Sediment Management Plan

Rugraw is required to develop a Debris and Sediment Management Plan (DSMP) that would include:

- Annual sluicing of sediments from the Proposed Project's reservoir when natural flow at the diversion site exceeds 418 cfs or, in years where natural flows never reach 418 cfs, evaluation of the sediment deposits in the reservoir to determine if sluicing is needed;
- Consultation with the State Water Board and CDFW to determine if the sluicing of sediments should occur when flows are less than 418 cfs;
- Monitoring turbidity associated with sediment sluicing events to document any project–caused exceedance of the Basin Plan's turbidity objectives;
- Periodic surveys of the Proposed Project impoundment to document sediment and woody material deposition; and
- Process to modify the DSMP as needed*.*

Erosion Control and Sedimentation

Rugraw will develop a SWPPP that outlines measures to prevent erosion and sedimentation during Proposed Project construction. The SWPPP would include, at a minimum, provisions to:

- Limit surface disturbance to only those areas necessary for construction, thereby preserving existing vegetation;
- Salvage and stockpile topsoil and, following construction, replace, regrade and seed topsoil with native vegetation;
- Use temporary fencing and protective barriers to protect vegetation not required to be removed;
- Initiate construction immediately following vegetation clearing to minimize the exposure of disturbed areas to wind and water erosion;
- Slope roadways and excavations away from washes and clear loose soils and sediments in areas where haul roads would cross surface washes;
- Install washed riprap at the washes;
- Build small earthen embankments within washes to slow or divert surface water;
- Install silt fences in work areas near a wash to prevent sediment from entering the wash during rain storms; and
- Apply water to disturbed soil areas to ensure excessive runoff does not occur and to control wind erosion and dust.

Rugraw also will use cofferdams and other structures to isolate in–water work areas and allow for construction "in the dry." Other proposed BMPs include installation of sedimentation basins for capturing solids in stormwater runoff, placement of construction materials to avoid erosion from flowing water, and construction of permanent roads with gravel depth and quantity to maintain a stable road surface.

The State Water Board will require control measures for erosion, excessive sedimentation, and turbidity at the commencement of, and throughout, any ground–clearing activities, excavation, or other Proposed Project activities that could result in erosion and sedimentation discharges to Proposed Project waters. In addition, the State Water Board will require the use of washed riprap, rock, and gravel placed within or adjacent to any watercourses and monitoring of water quality for turbidity during construction.

2.4 References

California Department of Fish and Game (CDFG). 2002. California Salmonid Stream Habitat Restoration Manual. Fourth Edition. Appendix S. Fish Screen Criteria. December 2002.

Central Valley Regional Water Quality Control Board (CVRWQCB). 2018. Water Quality Control Plan for the California Regional Water Quality Control Board Central Valley Region for the Sacramento River Basin and the San Joaquin River Basin. Fifth Edition. Revised May 2018 (with Approved Amendments).

Federal Energy Regulatory Commission (FERC). 2018. Final Environmental Impact Statement for Hydropower License, Lassen Lodge Hydroelectric Project, FERC Project Number 12496–002. California. July.

FERC. 2019. Programmatic Agreement Between the California State Historic Perseveration Officer for Managing Historic Properties That May Be Accepted by Issuing An Original License to Rugraw, LLC for the Construction and Operation of the Lassen Lodge Hydroelectric Project in Tehama County, California (FERC Number 121496–002).

Rugraw, LLC. 2019. Letter to State Water Resources Control Board “Lassen Lodge Hydroelectric Project FERC Project Number 12946–002 Re–Submittal of Application for Water Quality Certification”. November 14.

Tetra Tech. 2014. Noxious Weed Management and Revegetation Plan, Lassen Lodge Hydroelectric Project FERC License Number 12496 South Fork Battle Creek Tehama County, California. August.

Tetra Tech. 2015. Final License Application Exhibit F, Drawings Lassen Lodge Hydroelectric Project FERC License Number 12396 South Fork Battle Creek Tehama County, California. November 20.

U.S. Department of Commerce, National Oceanic and Atmospheric Administration National Marine Fisheries Service, West Coast Region. 2019. Letter to Kimberly D. Bose, Secretary Federal Energy Regulatory Commission, “Endangered Species Act Section 7(a)(2) Letter of Concurrence for the Proposed Lassen Lodge Hydroelectric Project (P–12496), located on the South Fork Battle Creek, California”. March 13, 2019.

Chapter 3 Alternatives Descriptions

3.1 Introduction

This chapter describes: (1) the California Environmental Quality Act (CEQA) Guidelines related to the development and screening of alternatives; (2) potential alternatives considered but eliminated from further evaluation; and (3) alternatives to be evaluated in detail in the environmental document, which include modified measures/conditions proposed by state and/or federal agencies during the Federal Energy Regulatory Commission (FERC) licensing proceeding. These alternatives are analyzed in detail in each applicable section of Chapter 4, Environmental Analysis. The analysis focuses only on the resource areas potentially affected by the alternatives presented in this chapter. Chapter 5, Alternatives Summary, provides a summary of the alternatives analysis and identifies the Environmentally Superior Alternative.

3.2 Alternatives Analysis and Screening Process

CEQA Guidelines section 15126.6 sets forth the following basic principles related to alternatives analysis:

- The discussion of alternatives shall focus on alternatives to the project or its location that are capable of avoiding or substantially lessening any significant effects of the project, even if these alternatives would impede to some degree the attainment of the project objectives or would be more costly.
- The “no project” alternative shall be evaluated, along with its impacts. The “no project” analysis shall discuss the existing conditions at the time the notice of preparation was published, as well as what would be reasonably expected to occur in the foreseeable future if the project was not approved, based on current plans and consistent with available infrastructure and community services.
- The range of alternatives required in an EIR shall be governed by a “rule of reason”; therefore, the EIR needs to evaluate alternatives necessary to allow decision–makers to make an informed decision on project approval or disapproval.
- An EIR need not consider an alternative whose effects cannot be reasonably ascertained or that would not achieve most of the basic project objectives.

According to CEQA, the range of feasible alternatives should be selected and discussed in a manner that fosters meaningful public participation and informed decision–making. The development of the range of feasible alternatives included for analysis in this CEQA document was based on a thorough review of recommendations by other parties proposed during licensing of the Proposed Project, comments received during the State Water Board’s public scoping meetings, and independent analysis completed by the State Water Board staff. From this review and analysis, the State Water Board identified the following range of alternatives.

3.3 Alternatives Considered but Eliminated

Section 15126.6, subdivision (c) of the CEQA Guidelines requires that draft EIRs explain briefly why other alternatives were rejected. The State Water Board considered two alternatives that

were eliminated from analysis: an 8 cfs minimum instream flow proposed by Rugraw[9] in its comments on FERC's Draft Environmental Impact Statement (EIS) (Rugraw 2018) and a permanent upstream fish ladder.

3.3.1 8 cfs Minimum Instream Flow

FERC's Final EIS found that an 8 cfs minimum instream flow would reduce Chinook and steelhead habitat in the bypass reach by 30 to 51 percent and increase generation by 1,860 MWh per year (about 7.5 percent) (FERC 2018b). While the 8 cfs alternative would support the Proposed Project's goals of generating electricity and contributing to California's RPS requirements, it would not meet the goal of avoiding damage to fish and would not adequately beneficial uses. The impact to fish and beneficial uses would outweigh the benefit of generating an additional 1,860 MWh per year. As such, this EIR does not analyze the 8 cfs alternative.

3.3.2 Upstream Fish Ladder

An upstream fish ladder at the diversion dam would provide upstream passage to resident fish in the 0.7–mile reach between the proposed diversion dam site (RM 23.0) and Angel Falls (RM 22.3). An upstream fish ladder would not benefit anadromous salmonids, if they were reintroduced into the Project area, because Angel Falls is a fish passage barrier at all flows (Cramer et al. 2015; FERC 2018b). FERC's Final EIS found that the resident trout population upstream of the proposed diversion dam site is robust enough that it would not require reseeding by fish in the 0.7–mile reach (FERC 2018b). Further, any fish in this reach could move upstream of the diversion dam once the Project is offline and the pneumatic gates are lowered during the summer and fall low flow period. FERC also found that the cost to construct a fish ladder would be $300,000; this would be more expensive than any other Proposed Project component (FERC 2018b, Table 4–3). The impact to resident trout would not justify this cost. CEQA Guidelines section 21081(a)(3) state that a lead agency may eliminate an alternative if it is economically infeasible; for this reason, this EIR does not analyze the upstream fish ladder alternative.

3.4 Alternatives Evaluated in this EIR

Each alternative analyzed in Chapter 4 is described below.

3.4.1 CEQA No Project Alternative

Section 16126.2, subdivision (e)(2) of the CEQA Guidelines defines the No Project Alternative as what would reasonably be expected to occur in the foreseeable future, based on current plans and consistent with available infrastructure and community services, if the project was not approved and implemented.

If the certification application is denied, FERC would not issue a license order authorizing the construction, operation, and maintenance of the Proposed Project. The Proposed Project would not be implemented and the existing environmental conditions and resources would be maintained or unchanged in the future. The State Water Board has developed the following

[9] Rugraw requested that FERC analyze 8 cfs as an alternative in the Final EIS but did not specify that it wanted to change its 13 cfs proposal.

assumptions regarding reasonable events that would occur under the No Project Alternative if Certification is denied:

- Current and future regulatory requirements would continue; and
- Private landowners would continue to manage their land without any additional state or federal oversight related to conditions proposed during the FERC licensing process.

3.4.2 Alternatives Proposed by State/Federal Resource Agencies

The following describes alternative conditions proposed by state and/or federal agencies during the FERC licensing process. These alternative conditions were independently analyzed by State Water Board staff and compared to the Proposed Project in Chapter 4, Environmental Analysis. The following describes the alternatives evaluated in detail in the environmental analysis.

3.4.2.1 Alternative 1 – Minimum Instream Flow

Description

Alternative 1 proposes a minimum instream flow (MIF) of 25 to 35 cubic feet per second (cfs) year–round in the bypass reach compared to the Proposed Project MIF of 13 cfs year–round.

Rationale

In their preliminary 10(j) recommendations for the Proposed Project, Interior (2016) and NMFS (2016) (Recommendation 1), state that the MIF in the bypass reach should be 35 cfs (or natural inflow, if less) to provide for various habitat characteristics (e.g., connectivity). In particular, the recommended flow is based on a PHABSIM analysis done by USFWS on six transects from the bypass reach provided by Cramer Fish Sciences (Interior 2016) that suggests the maximum average habitat for Chinook and steelhead fry and juvenile life stages occurs at 35 cfs. In a subsequent letter filed on April 5, 2018 (letter from B.A. Thom, Regional Administrator, NMFS, to K.D. Bose, Secretary, FERC), NMFS recommended that FERC staff analyze alternative minimum flows of 35 cfs (November 1 to March 1), 30 cfs (March 2 to May 31), and 25 cfs (June 1 to October 31).

Subsequent to the Final EIS, NMFS concurred with FERC that the Proposed Action, including the 13 cfs MIF, may affect, but is not likely to adversely affect ESA–listed CV spring–run Chinook salmon, California Central Valley steelhead, and their designated critical habitats. This determination was based on an additional condition proposed by NMFS and agreed to by Rugraw that if the Chinook salmon and/or steelhead were detected in the bypass reach in the future, Rugraw would provide monthly pulse flows of 30 cfs (November to May). Further, Rugraw would provide NMFS a Biological Assessment (BA) within 30 days of Chinook salmon and/or steelhead being detected in the bypass reach. Upon NMFS's review and through informal consultation with Rugraw and FERC, NMFS would assess if Proposed Project operations are adversely impacting anadromous salmonids, mitigation options (if appropriate), and if the License should be re–opened.

In its Final EIS, FERC (2018b) analyzed the full range of minimum flows (i.e., 13 to 35 cfs) using habitat data from Cramer and Ceder (2013) and the USFWS (2016) PHABSIM. Based on this analysis, FERC Staff recommended a MIF of 13 cfs. The recommendation was based on various considerations, but in particular, that natural (unimpaired) flow in the bypass reach is

often much lower than 13 cfs and is likely the limiting factor for the current resident *O. mykiss* fishery. Similarly, CDFW (2016) concurred with Rugraw's 13 cfs MIF proposal for the current situation where anadromous fish are not present in the bypass reach due to downstream barriers.

However, an expanded analysis of MIFs is warranted. Thus, the analysis for Alternative 1 incorporates: (1) the latest available Proposed Project hydrology data; (2) the latest available flow versus habitat data from Cramer et al. (2015); and (3) a re–analysis of the USFWS/NMFS PHABSIM data.

Affected Environmental Resources

Alternative 1 specifically addresses MIFs. As such, the majority of environmental resources analyzed in Chapter 4 would not be affected by this alternative, and impacts would not change when compared to the Proposed Project. Therefore, the CEQA analysis focuses only on those environmental issues that would potentially be affected by this alternative differently from those analyzed for the Proposed Project. These issues are discussed in *Section 4.6, Biological Resources – Aquatics and Fisheries*. In addition, a discussion of how water availability for power generation would be affected by the alternative is provided in Chapter 4.

3.4.2.2 Alternative 2 – Ramping Rates

Description

Alternative 2 evaluates ramping rates, including the following: (1) the appropriateness of a 1.0 inch per hour down ramping and up ramping rate for protecting biological resources, and (2) additional analysis to derive a down ramping rate (4 inches over 20 days) that is protective of foothill yellow–legged frog breeding habitat (e.g., Yarnell et al., 2016), specifically related to potential foothill yellow–legged frog egg mass/tadpole dewatering. The previously analyzed (FERC 2018) and agency recommended ramping rates (i.e., 0.1 ft per hour from FERC and CDFW and 1.0 inch per hour from NMFS) (FERC, 2018b; CDFW, 2016; NMFS, 2016) did not distinguish between down ramping and up ramping rates, did not distinguish between Proposed Project–induced and natural ramping rates, and potentially did not adequately protect foothill yellow–legged from egg masses/young tadpoles or fish redds.

Rationale

CDFW (2016) 10(j) recommended a 0.1 ft per hour down ramping rate in the bypass reach when water is being diverted and put into the conveyance system (i.e., down ramping). Rugraw adopted CDFW's 10(j) recommendation in a letter dated August 31, 2016. NMFS's (2016) 10(j) recommendation was 1.0 inch per hour ramping rate, which corresponds to a frequently recommended down ramping rate for hydropower projects. The ramping rate was developed by Hunter (1992) to protect salmonid fry from stranding during down ramping. However, NMFS's recommendation did not identify if the ramping rate was an up ramping and/or down ramping rate.

In FERC's Final EIS (2018b), the Proposed Action Environmental Measures identified a ramping rate of 0.1 foot per hour and the FERC Staff Alternative adopted a 1.0 inch per hour ramping rate as being slightly more protective. The ramping rate measure did not distinguish between Proposed Project and non–Project induced ramping rates, down ramping and up ramping

environmental effects, and seasonal species/lifestage effects (e.g., fish fry stranding and FYLF egg masses and/or tadpole dewatering or displacement). The 1.0 inch per hour ramping rate in the FERC (2018b) Staff Alternative ultimately was derived from the Hunter (1992) literature review/recommendations that have been adopted in a large number of other proceedings. However, the Hunter (1992) recommendations are seasonal down ramping rates specific to protecting fry stranding and are not up ramping recommendations. For example, Hunter (1992) stated:

> *The biological effects of unnatural flow increases are usually irrelevant in regulating hydropower operations because public safety concerns justify more stringent regulations than biological concerns. Flow increases can strand and occasionally drown fishermen and other people located on bars, rocks, or in confined canyons. Boaters might also be at risk under some circumstances. The remaining discussion in this review deals exclusively with the effects of decreases in flow…*
>
> *Stranding is the separation of fish from flowing surface water as a result of declining river stage. Stranding can occur during any drop in stage. It is not exclusively associated with complete or substantial dewatering of a river. Stranding can be classified into two categories: Beaching is when fish flounder out–of–water on the substrate. Trapping is the isolation of fish in pockets of water with no access to the free–flowing surface water….*

Olson (1990) determined that a ramping rate of 1 inch per hour was adequate to protect steelhead fry. However, the ramping rate was measured at a confined river transect, whereas the stranding was observed on lower gradient bars further downstream. Thus, the effective ramping rate at these bars was less than 1 inch per hour.

With respect to foothill yellow–legged frogs, which potentially occur in the bypass reach, slow down ramping is needed to prevent dewatering of egg masses (Yarnell et al., 2016). A down–ramping rate of 4 inches over 7 days (or 1 foot over 3 weeks) was proposed by Rugraw to prevent stranding of foothill yellow–legged frog egg masses and tadpoles during the foothill yellow–legged frog breeding and early rearing period (mid–April through mid–July).

Affected Environmental Resources

Alternative 2 specifically addresses ramping rates. As such, the majority of environmental issues analyzed in Chapter 4 would not be affected by the alternative, and impacts would not change when compared to the Proposed Project. Therefore, the CEQA analysis focuses only on those environmental issues that would potentially be affected by the alternative differently from those analyzed for the Proposed Project. These issues are discussed in *Section 4.6, Biological Resources – Aquatics and Fisheries*. In addition, a discussion of how the water available for power generation would be affected by the alternative is provided in Chapter 4.

3.4.2.3 Alternative 3 – Temperature Proposed Project Shutdown Thresholds

Description

Alternative 3 identifies project temperature shutdown criteria to protect aquatic species and life stages during various seasons and uses empirical data to determine if the Proposed Project is cooling water temperature in the bypass reach (beneficial effect; allows Proposed Project

operations to continue) or warming water temperature in the bypass reach (negative effect; requires Proposed Project shutdown). Alternative 3 explicitly evaluates Proposed Project–induced temperature effects in both the bypass reach and in the tailrace reach downstream of the powerhouse in the context of: (1) the existing conditions, where only resident salmonid species (e.g., rainbow trout) are present in the bypass reach, and (2) the potential future condition where ESA–listed salmonids access the bypass reach.

The Proposed Project incorporates an average daily temperature Project shutdown threshold of 20°C, if there is Proposed Project–induced warming in the bypass reach based on real–time monitoring at the diversion and above Spring Number 4 (upstream of the powerhouse). The single criterion, 20°C, biologically is tailored to the summer season/life stages. CDFW also recommended an average daily temperature threshold of 20°C and State Water Board (2018) proposed 20°C 7–Day Average Daily Maximum (7DADM). Interior and NMFS 10(j) Recommendation 2 requested curtailing Proposed Project operation, as needed, to prevent the temperature seasonal/life stage specific exceedance for spring–run and winter–run Chinook salmon in the bypass reach downstream of Angel Falls, as shown in Table 3.1.

Table 3–1. Interior and NMFS Temperature Recommendations

Life Stage	Interior 7DADM	NMFS 7DADM
Spawning (November 1 to March 1)	13°C	13°C
Holding and Rearing (March 2 to May 31)	15.5°C[a]	16°C
Migration and Summer Holding (June 1 to October 31)	18°C	18°C

a. USFWS modified its previously recommended 16°C criterion during the March 15, 2018, section 10(j) meeting, where it indicated that it was now recommending 15.5ºC from March 2 to May 31 for spring–run and winter–run Chinook salmon holding and rearing and the same 7DADMs as NMFS for the rest of the year.

Rationale

FERC's Final EIS analyzed the various alternatives proposed by the resource agencies (identified above) and presented the Staff Alternative that is currently included in the Proposed Project. However, the analysis only covered the bypass reach and did not specifically address the tailrace reach downstream of the powerhouse to Panther Grade. Further, although the analysis addressed the current fish species/life stages, it did not specifically address a potential future condition where ESA–listed salmonids access the bypass reach. The analysis did not include a biological rationale regarding the use of an average daily temperature criteria versus an average 7DADM criterion as is used in EPA (2003) to protect salmonid life stages.

Affected Environmental Resources

Alternative 3 specifically addresses temperature thresholds/Proposed Project shutdowns. As such, the majority of environmental issues analyzed in Chapter 4 would not be affected by the alternative, and impacts would not change when compared to the Proposed Project. Therefore, the CEQA analysis focuses only on those environmental issues that would be affected differently from those analyzed for the Proposed Project. These issues are discussed in *Section 4.6, Biological Resources – Aquatics and Fisheries*. In addition, a discussion of how the water available for power generation would be affected by the alternative is provided in Chapter 4.

Refer to *Chapter 5, Alternatives Analysis* for a comparison of these alternatives and a discussion of the Environmentally Superior Alternative.

3.4.3 References

Caldwell, Timothy J., Gabriel J. Rossi, Rene E. Henery, and Sudeep Chandra. 2018. Decreased streamflow impacts fish movement and energetics through reductions to invertebrate drift body size and abundance. *River Research and Applications,* 1–12. doi.org

Cramer, S.P., K. Sellheim, P.J. Haverkamp, K. Ceder, and J. Simonis. 2015. Lassen Lodge hydroelectric project fish habitat survey and capacity modeling final report, South Fork Battle Creek. Prepared for Rugraw, LLC. Revision Number 2.

Federal Energy Regulatory Commission (FERC). 2018a. Transcript of Public Meeting for Lassen Lodge Hydroelectric Project in Sacramento, California P–12496–002. 20180315–4004 FERC PDF. elibrary.ferc.gov

FERC. 2018b. Final Environmental Impact Statement for Hydropower License, Lassen Lodge Hydroelectric Project, FERC Project Number 12496–002. California. FERC/EIS–0276. FERC, Office of Energy Projects, Washington, D.C.

Hunter, Mark A. 1992. Hydropower Flow Fluctuations and Salmonids: A Review of the Biological Effects, Mechanical Causes, and Options for Mitigation. State of Washington Department of Fisheries. Technical Report Number 119. wdfw.wa.gov

National Marine Fisheries Service (NMFS). 2016. Letter from Steve Edmondson (NMFS) to Secretary Bose (FERC), Re: "United States Department of Commerce's, National Oceanic and Atmospheric Administration's Fisheries Service, West Coast Region, Federal Power Act COMMENTS, Preliminary Section18 PRESCRIPTIONS, Section10(j) CONDITIONS, and Section10(a) RECOMMENDATIONS for the Lassen Lodge Hydroelectric Project, Federal Energy Regulatory Commission Project Number 12496–002, located on South Fork Battle Creek, California." NMFS, West Coast Region, Sacramento, California. June 21, 2016.

NMFS. 2018. Letter from Steve Edmondson (NMFS) to Secretary Bose (FERC), Re: "United States Department of Commerce's, NOAA Fisheries' Comments Regarding the Federal Energy Regulatory Commission's Draft Environmental Impact Statement, Section 10(j) Inconsistency Letter, and Request for Concurrence under the Endangered Species Act Letter for the Lassen Lodge Hydroelectric Project, Project Number 12496–002, located on South Fork Battle Creek, California." NMFS, West Coast Region, Sacramento, California. January 31, 2016.

Northwest Hydraulic Consultants (NHC). 2015. Sediment Transport Analyses for South Fork Battle Creek, Lassen Lodge Hydroelectric Project (FERC Number 12496), Final Report Prepared for Rugraw, LLC. Redding, California. elibrary.ferc.gov

Rugraw, LLC. 2014. Final License Application for FERC Project Number 12496, Lassen Lodge Hydroelectric Project. elibrary.ferc.gov

Rugraw, LLC. 2018. Letter from Charlie Kuffner (Rugraw) to Secretary Bose (FERC), Re: Applicant Comment to FERC issued Draft EIS. February 2, 2018.

United States Environmental Protection Agency (EPA). 2003. EPA Region 10 Guidance for Pacific Northwest State and Tribal Temperature Water Quality Standards. EPA 910–B–03–002. Region 10 Office of Water, Seattle, Washington. nepis.epa.gov

United States Fish and Wildlife Service (USFWS). 2016. Letter from Patricia Sanderson Port (USFWS) to Secretary Bose (FERC), Subject: "Review of Notice of Application Ready for Environmental Analysis and Soliciting Comments, Recommendations, Terms and Conditions and Prescriptions; Lassen Lodge Hydroelectric Project (Major Original License) FERC No. 12496002; Tehama County, California." USFWS, Pacific Southwest Region, San Francisco, California. June 24, 2016.

Yarnell, Sarah, Ryan Peek, Gerhard Epke, and Amy Lind. 2016. Management of the Spring Snowmelt Recession in Regulated Systems. *Journal of the American Water Resources Association,* 52(3), 723–736. doi.org

Chapter 4 Environmental Analysis

4.1 Introduction

This chapter provides the environmental analysis of the Proposed Project. Initial analysis shows that, for several resource areas, there is no possibility of impacts and, accordingly, these resource areas can be eliminated from more detailed analysis, as provided in Section 4.2. The remaining resource areas are addressed in detail throughout the chapter. These sections describe the existing physical and regulatory setting to characterize the conditions that could be affected by, or applied to, the Proposed Project; describes the analytical methodology and criteria used in determining the significance levels of Proposed Project impacts; and identifies environmental impacts of the Proposed Project. Finally, each section recommends mitigation measures to reduce or eliminate, where possible, the adverse environmental effects of the Proposed Project, if Rugraw's proposed environmental measures and plans are not adequate to eliminate or reduce to less than significant the environmental effects.

4.2 Resource Areas Eliminated from Further Analysis

The following discussion addresses environmental resource topics that would not be affected by the Proposed Project, resulting in a "No Impact" level of significance under CEQA.

4.2.1 Mineral Resources

The most common mineral resources in Tehama County include chromium, copper, manganese, gold, and silver. Within the Proposed Project area, one prospect mine[10] (Joe Arnol Prospect) is located in Manton, west of the transmission line proposed along Manton School Road (The Diggings™, 2020). No other active mines or claims are present within the Proposed Project area.

The Proposed Project would not require the extraction or use of any mineral resources. Although the Joe Arnol Prospect is located adjacent to the proposed transmission line, all construction and operation of the line would occur within the existing road right–of–way (ROW), and therefore would not 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. Since no other mineral resources have been identified, the Proposed Project would not 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.

Therefore, no impacts related to mineral resources would occur.

4.2.2 Population and Housing

During the construction period, the Proposed Project would employ approximately 30 people during peak construction. It is anticipated that these contract workers would be Tehama County residents and individuals who would relocate temporarily to the Proposed Project area.

[10] Once a mineral deposit discovery is made, the property containing the deposit, called the prospect, is explored to determine the characteristics of the deposit. The property to be explored is called a prospect mine.

Following construction, three full–time jobs are expected to be maintained for the operational life of the Proposed Project.

Red Bluff and Redding are within commuting distance of the Proposed Project. It is expected that a large portion of the skilled work force would commute from those areas. In 2015, the housing vacancy rate was 12.9 percent, suggesting there is adequate available housing to meet Proposed Project needs (FERC, 2018). The Proposed Project would not displace existing people or housing. Therefore, the Proposed Project would not result in the need to construct new housing.

The purpose of the Proposed Project is to supply hydroelectric power to meet part of California's power requirements, resource diversity, and capacity needs. Specifically, under Senate Bill 100, the state mandates utilities to procure 100 percent of their electricity from eligible renewable resources by 2045. As such, in the long run, the Proposed Project would provide power that would replace generation from non–renewable sources and would not ultimately increase power generation. This zero–net change in power generation would not impact long–term population or housing. In the interim, it is not anticipated that the additional 24,936 MWh per year would be growth inducing or allow substantial unplanned growth in the area. In addition, the small scale of additional employees, during both construction and operation, would not be considered a substantial increase in unplanned population growth in the area. None of the Proposed Project activities would result in displacement of housing or convert non–residential zones to residential zones.

Therefore, no impacts related to population and housing would occur.

4.2.3 Public Services

Proposed Project facilities would not rely heavily on or involve public services such as police, schools, and parks due to the nature of the Proposed Project as a hydroelectric power facility. Temporary construction–related increases in population (up to 30 people during the construction period) and the addition of three permanent personnel to maintain and operate the Proposed Project would be considered minor. The Proposed Project would not expand upon the service area of existing service providers. Any increase in demand on local service providers associated with the Proposed Project is expected to be minimal.

Proposed Project facilities would rely on fire protection services. According to the Fire Safety and Sheriff Protection Element of the Shasta County General Plan, fire protection services are provided by both the Shasta County Fire Department and California Department of Forestry and Fire Protection (CAL FIRE). Issues related to adequate emergency response and wildfire are addressed in Section 4.12, Hazards and Hazardous Materials, Section 4.17, Transportation and Section 4.19, Wildfire. In addition, Rugraw is required to coordinate with CAL FIRE and Shasta County Fire Department to develop and implement, a Wildfire Mitigation Plan (WMP), per California Public Utilities Commission regulations (Rulemaking 18–10–007 updated Dec.16, 2019 as clarified Dec. 23, 2019). Elements of the WMP would ensure that fire protection services are adequate to service the Proposed Project, particularly related to the transmission line.

Overall, existing service providers would be able to meet the needs of the local population and construction–related population without the need for new or physically altered government facilities. Since the Proposed Project would not generate a substantial new population, the

Proposed Project would not impede or increase response times for police protection, or other public services, or require that any existing government facilities (including schools or parks) be built or altered.

Therefore, no impacts would occur related to these public services.

4.2.4 Utilities and Service Systems

Construction–related activities could temporarily disrupt services. Utility companies are required to notify the County and residents of any planned disruption. In addition, Rugraw is required to notify the Underground Service Alert of any planned construction that could affect underground facilities owned by public agencies and private companies. The agency or company is required to mark or stake their facility and provide clearance for any excavation. Above ground utilities, such as power poles would be avoided. Therefore, although a temporary disruption could occur to existing utilities and service systems during construction, it would not be considered significant and adverse.

Proposed Project facilities would not heavily rely on utilities and service systems due to the nature of the Proposed Project as a hydroelectric power facility. Temporary construction–related increases in population (up to 30 people during the construction period) and the addition of three permanent personnel to maintain and operate the Proposed Project would be considered minor. Overall, existing service providers would be able to meet the needs of the local population and construction–related population without the need for relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities. Any solid waste generated during construction would be considered minor and disposal is required to comply with federal, state, and local statutes regarding solid waste.

Construction of a new electric power facility could cause significant environmental effects (i.e. dust emissions, noise, etc.). All Proposed Project construction activities, including those necessary for utilities are analyzed in each environmental analysis section (Chapter 4) of this EIR, and as such there is no need for separate analysis of those impacts in this section.

As discussed in *Section 4.9, Energy,* the Proposed Project would provide some benefit by providing an additional clean–energy resource.

Therefore, no impacts would occur related to utilities and service systems.

4.2.5 Water Rights

Rugraw has a deeded easement in perpetuity for the Proposed Project facilities on both sides of South Fork Battle Creek, from above the diversion/intake structures to below the powerhouse/tailrace and substation. The Proposed Project includes riparian water rights that cover the proposed non–consumptive use. There are no other water right holders in the bypass reach. Further, since the Proposed Project is run–of–river with no storage, and all water is returned to the creek below the powerhouse tailrace, downstream water right holders would not be affected.

4.2.6 References

FERC. 2018. Final Environmental Impact Statement for Hydropower License, Lassen Lodge Hydroelectric Project, FERC Project No. 12496–002. California. FERC/EIS–0276. FERC, Office of Energy Projects, Washington, D.C.

The Diggings™. 2020. Found at: thediggings.com.

4.3 Aesthetics

This section discusses potential impacts to aesthetics and visual resources including potential impacts to the visual character of the Proposed Project site and surroundings that could result from construction, operation, and maintenance of the Proposed Project. The analysis is based on the review of existing resources, technical data, and applicable laws and regulations. Field observations were conducted in October of 2019 to document existing visual conditions in the Proposed Project area and to identify potentially affected sensitive viewing locations.

4.3.1 Environmental Setting

4.3.1.1 Regional Setting

The Proposed Project is located within Tehama County, which can visually be characterized as having a broad range of landscapes that change with the gradual increase in elevation. As stated in the Tehama County General Plan, elevations range from the fertile floor of the Sacramento River Valley (elevation at Red Bluff is 341 feet) to more than 9,200 feet at the peak of Brokeoff Mountain on the County line. The diverse environments of the region are represented by distinct natural communities and landforms that display different development patterns and historical features (Tehama County, 2009).

The Proposed Project is located on upper South Fork Battle Creek on the western slopes of the Cascade Range, approximately 1.5 miles west of the town of Mineral, an unincorporated community in Tehama County. Generally, the Proposed Project area is characterized by steep canyon walls and inner canyon volcanic deposits incised by South Fork Battle Creek. Through a deeded easement obtained by Rugraw, Proposed Project facilities are located on Sierra Pacific Industries (SPI) lands in a remote scenic setting with minimal road and public access, with all access roads to SPI land gated and locked.

As excerpted from FERC's Final EIS (Section 3.3.6.1, Affected Environment, pages 139–140), the Proposed Project vicinity can be characterized by five distinct landscape types as follows:

South–Facing Slopes

These are typified by a varied vegetative mosaic composed of isolated groupings of montane forest habitats associated with side drainages entering South Fork Battle Creek from the north. Inclusions of chaparral, talus, and rock outcrop are also observable on these slopes, which are generally light in color, with grey/green vegetation and red/brown geology and soils. The visual texture is predominantly rounded, low–profile forms, punctuated by isolated conical forms of individual and clumps of trees. Views and vistas are generally unobstructed.

Coniferous North–Facing Slopes

These slopes are characterized by relatively dense and homogenous vegetative cover. Timber management activities, including harvesting and road construction have increased the number of openings, thereby providing numerous inclusions that offer vegetative diversity. This slope also contains a utility corridor and State Route (SR) 36 on the southern edge of the Proposed Project vicinity. These slopes are predominantly green, with red/brown soils in areas associated with roads and timber management activities. The visual texture is uniform, at the stand level. Timber management activities provide variation in size and density throughout, and views and

vistas may be limited, except in areas where timber management activities and established uses (roads, utilities) have resulted in large, continuous openings in the canopy.

Mixed Woodland North–Facing Valley Slopes

These slopes consist of dense cover of low growing chaparral species, punctuated by taller hardwood and conifer species. To a lesser extent, timber management activities have occurred in this type of landscape, particularly in the form of roads and skid trails constructed to access conifer stands. These slopes vary between blue and green, depending on the type and density of vegetation. Soils and rock outcrops are typically various shades of red and brown. The visual texture has a high degree of diversity in shape and form, with the interaction of vegetation of geologic features and vegetation. The views and vistas are highly variable, particularly in areas where timber management activities have occurred.

Creek Floodplain

This area is composed of relatively gentle slopes, a colluvial stream channel, localized alluvial deposits, and riparian vegetation. This landscape has elements of riparian and upland vegetation, including chaparral, hardwoods, and conifers. It also has flowing water and localized aquatic vegetation that contributes to the character of the landscape. Anthropogenic activities, including the old abandoned Highway 36 corridor, and timber management activities, have contributed to its character. Features such as bridges and abutments, and paved roads are superimposed on the natural features of the landscape. This landscape has a wide range of colors, ranging from the blue–green water features to the black remnants of the old highway. The visual texture is highly diverse, and includes the sinuous feature of the creek and the distinct lines of roads and bridges. The views and vistas are largely dependent on the level of anthropogenic activity occurring in a specific area.

Creek Canyon and Gorge

This landscape is characterized by cliff walls and outcrops of exposed basaltic lava flows, waterfalls and cascades, large boulders and intermittent vegetation (riparian and upland). The landscape is highly diverse in association with the topographic features of volcanic terrain. Although numerous roads and trails have been constructed on or adjacent to the rim of the gorge, little evidence of anthropogenic activity is observable below the rim. Colors within this landscape are a contrast of dark grey/brown rock, green vegetation, and the colors of water. The visual texture is dominated by canyon walls, with vegetation and channel features. The inner gorge with vertical walls in excess of 100 feet combined with the sinuous stream channel severely constrains views and vistas below the rim.

4.3.1.2 Potentially Affected Viewers

The area of assessment includes those areas that could be affected by Proposed Project construction, operation, and maintenance. For aesthetic impacts this includes any recreational facilities, including rivers and trails, and viewsheds of visual resources from various points within the Proposed Project area. Accepted visual assessment methods, including those adopted by Federal Highway Administration and other federal agencies, establish sensitivity levels as a measure of public concern for changes to scenic quality. Viewer sensitivity, one of the criteria for evaluating visual impact significance, can be divided into high, moderate, and low

categories. Factors considered in assigning a sensitivity level include viewer activity, view duration, viewing distance, adjacent land use, and special management or planning designation. Certain activities tend to heighten viewer awareness of visual and scenic resources, while others tend to be distracting. The primary potentially affected viewer groups within the Proposed Project area are described below.

Residential

Local residents experience views of the Proposed Project site from public viewpoints in close proximity to their homes. The town of Manton, with a population of 423, is the closest developed community adjacent to the Proposed Project site (approximately 0.7 mile from the proposed transmission line). The residents of Manton, most of whom are located on the western portion of the Proposed Project area, would be the most affected. In addition, more distant residences would have varying levels of visibility of the Proposed Project, depending on topography, vegetation, and orientation. Residential views tend to be long in duration. Sensitivity to visual change for this viewer group is considered moderate to high.

Recreational

View duration for this group could range from several minutes to several hours, and viewer sensitivity is considered moderate to high. Proposed Project facilities are located within heavily forested private lands owned by SPI or within a public ROW. Although public access is not allowed in the Proposed Project area, SPI logging roads can provide informal recreational trail use. However, there are no formal recreation areas located within the Proposed Project area or within 1 mile of proposed facilities.

Motorists

Transportation corridors located in the viewshed of the Proposed Project include both local and regional roads and highways. SR 36 is a County–designated scenic highway in the Proposed Project area used by commuters, local road users, and tourists. Tourists are generally more aware of overall appearance from the road, whereas local residents traveling the same routes frequently may be acclimated to the general view, but are more likely to be aware of visual changes. Affected motorists' views are generally brief in duration, typically lasting less than a few minutes. Viewer sensitivity is considered low to moderate.

Pedestrians and Cyclists

Within the Proposed Project vicinity, pedestrians and cyclists are a smaller viewer group. With their travel speeds slower than those of motorists, the view duration of pedestrians and cyclists is generally longer; therefore, this viewer group may be more likely to notice detail with respect to visual change in the environment. Viewer sensitivity of pedestrians and cyclists is considered moderate.

4.3.1.3 Key Viewing Areas

In the FLA Environmental Report (ER) (Rugraw, 2014), six Key Viewing Areas (KVAs) were identified that provide views of the Proposed Project area as seen from the sensitive view groups. However, since submittal of the ER, Rugraw modified the transmission line

configuration to address aesthetics concerns of residents along Manton School Road. As a result, three of the original six KVAs are discussed in this EIR.

Figure 4.3–1 shows the location of the KVAs within and adjacent to the Proposed Project Area. The primary viewer groups would be residents and motorists. Residential viewers include rural residences and ranch or farm facilities, most of which are located on the western portion of the Proposed Project. Motorists are those users who have a view of a given project feature or area from a publicly accessible roadway.

Table 4.3–1 provides a summary of the KVAs. Figures 4.3–2 through 4.3–4 provide photographs of the KVAs taken during a field reconnaissance.

Table 4.3–1. Key Viewing Area Viewpoints

Viewpoint Number	Location	Distance to Proposed Project Site	Proposed Project Site Visibility
KVA–1	Mount Lassen Vista Point	2.1 miles	Low to None
KVA–2	Hazen Road	120 feet	High
KVA–3	South Powerhouse Road	220 feet	Moderate

Source: Rugraw, 2014.

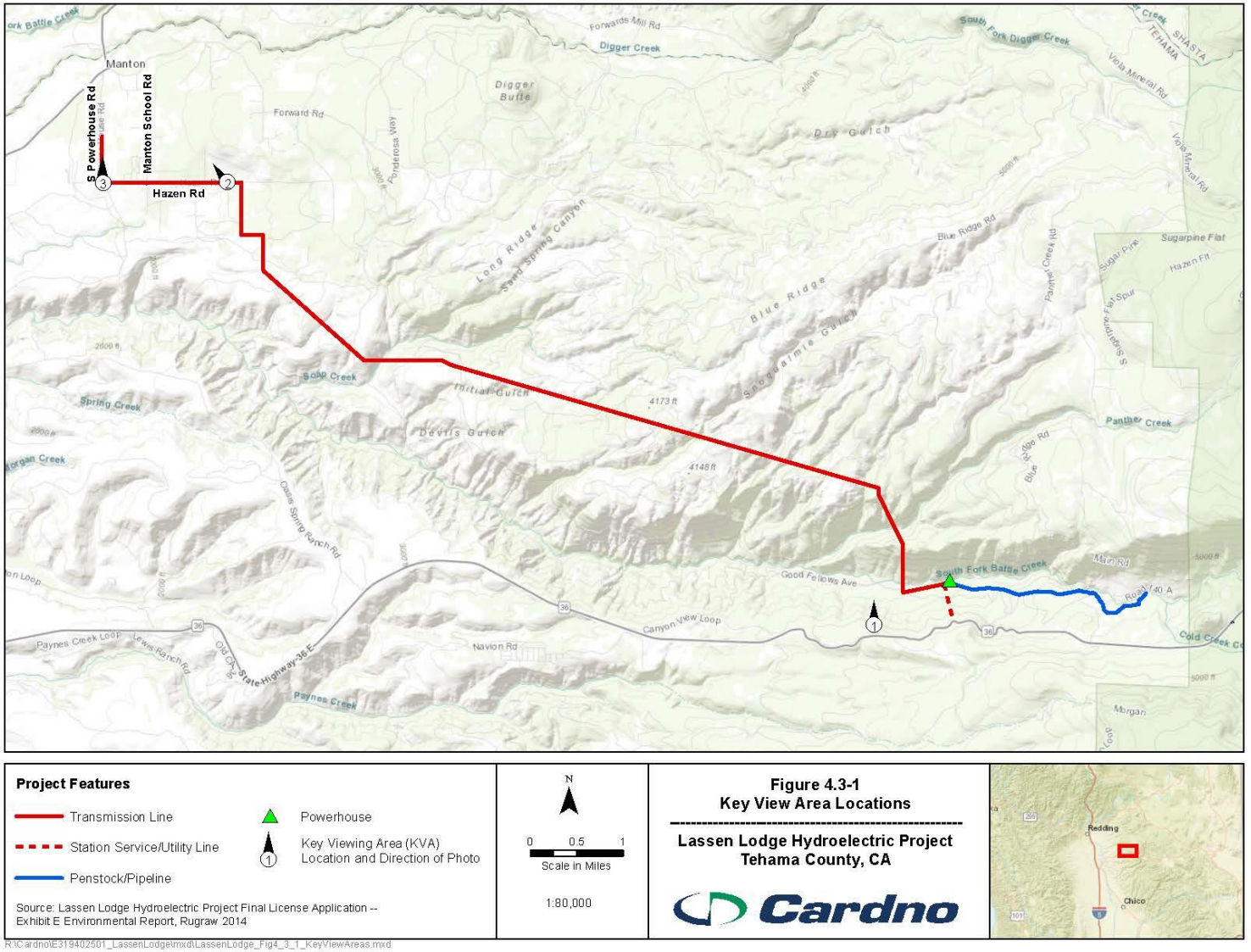

Figure 4.3–1. Key View Area Locations

Figure 4.3–2. Existing View of Proposed Project Area (KVA 1)

Figure 4.3–3. Existing View of Proposed Project Area (KVA 2)

Figure 4.3–4. Existing View of Proposed Project Area (KVA 3)

KVA–1: Mount Lassen Vista Point

KVA–1 is looking north from SR 36 at a vista point of Mount Lassen, approximately 2.1 miles south of the Proposed Project transmission line (refer to Figure 4.3–2). This KVA was chosen because it represents a highly sensitive view and is a high concentration area for traveling/recreational viewers. The view duration at this location is considered moderate overall, as the viewers would likely stop and consider the viewpoint directly toward the Proposed Project.

The undulating terrain of the foreground and middle ground allows for focal views of the background silhouettes, such as Mount Lassen. Topographic relief across the setting consists of moderate to high relief composition varying from relatively undulating terrain to more dramatic distant terrain, adding to the panoramic visual appeal to form and line characteristics of the area. There are no natural water features visible from this viewing angle and distance. There are no visible manmade modifications other than the roadway. The area is characterized by little color variations (desert tan, gray, olive green), and has low contrast of generally flat tones. Views from this KVA consist of natural desert scrub land juxtaposed against distant heavily forested landscapes.

Proposed Project features cannot be seen from this KVA due to the steep canyon location in which they are located and the dense surrounding vegetation.

KVA–2: Hazen Road

KVA–2 occurs on Hazen Road approximately 600 feet east of the Rolling Hills Road intersection, and approximately 120 feet north of the Proposed Project transmission line (refer to Figure 4.3–3). This KVA represents views available for local residents living along Hazen Road. This was chosen as a representative viewpoint because it is relatively close to the proposed transmission line and is indicative of views for both local travelers and residential viewers. The view duration at this location is brief for travelers, but long for adjacent residents.

The relatively flat terrain, combined with moderately vegetated foreground, does not allow for focal views of the background or any extended viewing distance. There are visible man–made modifications present in the landscape including roadway and fencing. The area is characterized by little color variations (desert tan, gray, forest green, olive green), and has low contrast of generally flat tones. Views from this KVA consist of a rural grassland landscape screened by foreground vegetation.

Viewers at this location have a partially screened view toward the Proposed Project transmission line, but the visibility would be high due to the close distance of the view.

KVA–3: South Powerhouse Road

KVA–3 occurs on South Powerhouse Road, approximately 220 feet south of the Proposed Project transmission line that would cross the roadway in the immediate foreground (refer to Figure 4.3–4). The substation is on the east side of the road and the utility pole is on the west side of the road.

The undulating terrain of the foreground and middleground is partially screened by trees, allowing focal views though there are some partial views of background silhouettes.

Topographic relief across the setting consists of moderate relief composition varying from relatively undulating terrain to more dramatic distant terrain (which is partially screened).

There is also an area adjacent to the view that is being cultivated for hay and there are scattered houses and farm buildings. There are no natural water features visible from this viewing angle and distance. There are visible manmade modifications including the roadway, transmission line, fencing, residences, and farm structures adjacent to the view. The area is characterized by color variations (desert tan, gray, brown, various shades of green and olive), and has generally flat hues which are characteristic of the Cascade Ecoregion. Views from this KVA consist of mostly semi forested and agricultural landscapes, as well as meadows.

The visibility of a Proposed Project component (transmission line) from KVA–3 would be moderate due to the existing vegetation providing some screening and the close distance of the view.

4.3.2 Regulatory Setting

4.3.2.1 Federal

There are no applicable federal regulations pertaining to aesthetics in the Proposed Project area.

4.3.2.2 State

California Department of Transportation

State scenic highways are designated by the California Department of Transportation (Caltrans) to promote the protection and enhancement of the natural scenic beauty of California's highways and adjacent corridors.

SR 36 passes through Red Bluff, the county seat of Tehama County, on the northern edge of the Sacramento Valley. The portion of SR 36 traveling past Lassen Volcanic National Park and Lake Almanor is part of the Volcanic Legacy Scenic Byway, a National Scenic Byway. Also, SR 36 between Alton and Susanville is a designated Blue Star Memorial Highway. However, in the Proposed Project area, SR 36 is not a designated or been identified as eligible for the State Scenic Highway System.

4.3.2.3 Local

Tehama County

The 2009 Tehama County General Plan Open Space and Conservation Element contains policies and implementation measures intended to protect the scenic views and aesthetic qualities of Tehama County. General Plan policies related to aesthetics include the following:

- *Policy OS–11.1:* Tehama County shall identify significant scenic viewsheds for public viewing areas in Tehama County–designated scenic highways, such as views of Mt. Shasta, Mt. Lassen, the Sacramento River, and the Coastal Range, and protect the visual integrity of the view shed.
  - *Implementation Measure OS–11.1a*: Identify public viewing areas and corresponding scenic viewsheds on Tehama County's designated scenic highways (State Routes

89, 172, 36, 32). Protect these areas from visually intrusive development that would alter the qualities of the view shed by establishing guidelines regulating development heights and lighting.

- *Policy OS–11.2*: Tehama County shall strive to protect the aesthetic and scenic beauty of its regional locations.
  - *Implementation Measure OS–11.2a*: Develop view shed preservation standards. Require that new development be designed to integrate building design, natural landforms, and vegetation in order to minimize alteration of scenic vistas.
  - *Implementation Measure OS–11.2b*: To the extent feasible, new development will be required to retain existing trees and vegetation and ensure that these resources are incorporated into project design wherever feasible.
  - *Implementation Measure OS–11.2c*: Require that cellular towers be designed and located in order to minimize visual impacts of the tower and protect the scenic views for surrounding existing uses.
  - *Implementation Measure OS–11.2d*: Tehama County may develop design standards regulating the appearance and design of hilltop and side–slope development.
- *Policy OS–11.3*: Tehama County shall consider the visual impacts of development within areas of significant topography, and shall work to minimize the visual impacts resulting from development of ridgelines.
  - *Implementation Measure OS–11.3a.* Consider the development of ridgeline and hillside development guidelines.
- *Policy OS–11.4*: New development should be designed to be compatible with surrounding development in ways that contribute to the desired character of the surrounding area.
  - *Implementation Measure OS–11.4a*: New development shall include provisions for the design of outdoor light fixtures to be directed/shielded downward and screened to avoid adverse nighttime lighting spill over effects on adjacent land uses and nighttime sky glow conditions.
  - *Implementation Measure OS–11.4b*: All new structures shall be designed to minimize glare potential including the use of low–emissive glazing, the pre–finishing of metallic surfaces to avoid hot–spots, and non–reflective window treatments and exterior surfaces. The use of mirrored coatings, industrial brushed or polished features, aluminum, or other non–weathering materials shall be strictly prohibited. Reflectivity may be reduced or mitigated through the use of deep overhangs or other methods to provide shading or shadowing.
  - *Implementation Measure OS–11.4c*: Non–glare glass shall be used in all new residential and commercial buildings to minimize and reduce potential sources of glare.

In addition, the General Plan identifies SR 36 as a County–designated scenic highway from Manton Road near Dales eastward to Tehama County line.

4.3.3 Analysis Methodology

4.3.3.1 Analytical Approach

Visual or aesthetic resources are generally defined as both the natural and built features of the landscape that are seen and that contribute to the public's experience and appreciation of the environment. The area of assessment for visual or aesthetic resources includes the viewshed of the Proposed Project, which includes the areas where the Proposed Project could be seen. This includes public viewing areas immediately adjacent to Proposed Project components, as represented by the KVAs, as well as more distant areas such as scenic vistas.

Impacts are generally defined in terms of a project's physical characteristics and potential visibility and the extent to which its presence would alter the perceived visual character and quality of the environment. This impact analysis describes the change to existing visual resources and assesses viewer response to that change.

4.3.3.2 Criteria for Determining Significance

As provided in Public Resources Code section 21099, aesthetic impacts shall not be considered significant for qualifying residential, mixed–use residential, and employment centers. Based on Appendix G of the 2020 CEQA Guidelines, the Proposed Project would have an impact on visual quality if it would:

- Have a substantial adverse effect on a scenic vista;
- Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway;
- In non–urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings. (Public views are those that are experienced from publicly accessible vantage points.)
- In an urbanized area, conflict with applicable zoning and other regulations governing scenic quality; or
- Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area.

Factors considered in applying these criteria to determine significance include the extent of Proposed Project visibility from residential areas, public open space, and designated scenic routes; the extent of change in the landscape's composition and character; the degree to which the various Project elements would contrast with or be integrated into the existing landscape; and the number and sensitivity of viewers. Proposed Project conformance with public policies regarding visual quality was also taken into account.

4.3.4 Environmental Impacts and Mitigation

To address potential Proposed Project related impacts to aesthetics, Rugraw has proposed General Construction Measures, resource protection measures, and Environmental Management and Monitoring Plans as discussed below.

4.3.4.1 Impacts Related to Scenic Vistas

IMPACT 4.3–1: Would the project have a substantial adverse effect on a scenic vista?

Construction, Operation, and Maintenance

Proposed Project effects would be considered substantial and adverse if they result in a permanent alteration of the visual character of scenic vistas used by the public in a manner that considerably reduces the aesthetic value of the vistas. There are no recognized scenic vistas within the Proposed Project viewshed. Therefore, the Proposed Project would not obstruct or substantially affect a scenic vista in the area and no impact would occur.

The discussion under Impact 4.3–3 provides detailed evaluation that indicates the Proposed Project would not substantially alter existing views of the open hillsides and ridgelines that are currently experienced by the public (refer to Figures 4.3–2 to 4.3–4).

Construction, Operation, and Maintenance Impacts

- **Level of Significance:** No Impact
- **Mitigation Measures:** None required

4.3.4.2 Impacts Related to Scenic Resources

IMPACT 4.3–2: Would the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?

Construction, Operation, and Maintena*nce*

There are no state or federal scenic highways in this region of the county. The closest scenic highway to the Proposed Project area is SR 36, as designated by Tehama County. As discussed for KVA 1 Mount Lassen Vista Point, no views are available of Proposed Project facilities due to topography and density of vegetation. In addition, no historic buildings would be damaged. The closest point of the Proposed Project area to SR 36 is approximately a half–mile away. Some motorists along SR 36 would be afforded brief, passing and long–distance views of portions of the transmission line, poles, and towers (Figure 4.3–4). The removal of trees and any rock outcroppings for Proposed Project facilities, including the transmission line, poles, and towers, would not be highly noticeable from SR 36 due to the distance. Since there are no designated state scenic highways in the Proposed Project area, and County–designated SR 36 provides distant views of short duration due to the high speeds of up to 55 miles per hour, construction, operation, and maintenance impacts would be considered less than significant.

Construction, Operation, and Maintenance Impacts

- **Level of Significance:** Less Than Significant Impact
- **Mitigation Measures:** None required

4.3.4.3 Impacts Related to Public Views

IMPACT 4.3–3: Would the Proposed Project substantially degrade the existing visual character or quality of public views of the site and its surroundings?

The Proposed Project area is composed of distant natural forested landscapes and undeveloped land. Foreground and middleground views are comprised of agricultural, semi–forested landscapes (refer to Figures 4.3–2 and 4.3–3). The typical viewer groups would be residential, recreational, motorists and bicyclists/pedestrians. Manton, a small town with a population of 423, is the closest developed community to the Proposed Project site (approximately 0.7 mile from the proposed transmission line), with rural residences located within 200 feet of the transmission line. The town of Mineral would be closest to the eastern part of the Proposed Project site at the diversion dam. County policies included in Tehama County General Plan Open Space and Conservation Element generally support the protection of existing visual resources. Therefore, visual sensitivity in the surrounding community and rural residences associated with implementation of the Proposed Project would significant.

To reduce Proposed Project related impacts to visual character and/or quality of public views, Rugraw has committed to implement the following General Construction and Visual Quality measures:

- General Construction Measures
  - Limit land disturbance and vegetation clearing to those areas needed for construction. Delineate the limits of construction, work areas, and multipurpose areas with flagging, fencing, and/or stakes to prevent land–disturbing activities outside of construction areas.
  - Stockpile natural topsoils and replace, regrade, and revegetate disturbed areas, in accordance with California forestry regulations and best practices, with native vegetation. Restore disturbed stream and riparian habitat to pre–construction conditions and with riparian plantings and/or seeding, where applicable, with seed mixes recommended by CDFW.
- Visual Quality Measures
  - Reduce visual contrast where over–story vegetation is removed by thinning and removing trees from the edge of the ROW to give a natural appearance, where possible.
  - Use composite poles as recommended for fire safety for wildland transmission lines to support the Proposed Project transmission line to blend with surrounding vegetation.

The Board of Forestry and Fire Protection's Forest Practice Rules and Fire Prevention System includes BMPs to control erosion, protect watercourses and riparian areas, reduce hazards and fire risks, and protect wildlife and wildlife habitat (CAL FIRE 2020).

Construction

Temporary disturbances to visual quality would occur from construction of Proposed Project facilities, ROW clearing, and the establishment and use of multi–use work areas. These short–term visual effects would be caused by heavy equipment excavating land, vegetation clearing, and by the presence of construction equipment. The predominant on–site construction activities, and any work requiring excavation or grading, would take place in the later spring, summer, and early fall, between approximately April 15 and October 15. In addition, on–site work on the turbine/generator and electrical and transmission systems may be year–round, but the majority of the site work would be accomplished in the April 15 to October 15 period. Some portions of the transmission line would require poles and conductors to be installed by helicopter. Construction activities would be evident to the public, and construction equipment would be present along South Powerhouse Road and Hazen Road, as shown in Figure 2–1, Proposed Project.

These temporary construction–related visual impacts would be lessened with implementation of Rugraw–proposed General Construction Measures 2 and 3, which would minimize land disturbance and vegetation clearing and restore disturbed stream and riparian habitat areas. With implementation of these measures, construction–related visual impacts associated with the Proposed Project would not substantially degrade the existing visual character or quality of the site and its surroundings. As a result, impacts related to construction of the Proposed Project would be less than significant.

Operation and Maintenance

New Proposed Project–related structures would affect the existing visual character of the Proposed Project area. Permanent impacts on aesthetics would occur primarily as a result of the transmission line, diversion dam, powerhouse, switchyard, and substation. Permanent conversion of forested habitat to herbaceous or shrub habitats along the pipeline/penstock, station service line, and 12–mile–long, 40–foot–wide transmission line ROW would also be considered a permanent impact on aesthetics.

Diversion Dam, Powerhouse, Switchyard, and Substation

The town of Mineral is closest to the eastern part of the Proposed Project site. However, Proposed Project facilities would not be visible to residents because the Proposed Project site is within a deeply incised valley. Impacts on aesthetics adjacent to the diversion dam, powerhouse, switchyard, and substation are expected to be minor. Proposed Project facilities would not be highly visible, if at all, from residential areas and local roadways. In addition, no developed recreation sites or specific recreational land use designations lie within Proposed Project lands or within 1 mile of Proposed Project facilities. Although land would be permanently disturbed and converted to other uses, impacts on aesthetics would be minor due to the limited public access and direct views to these areas of the Proposed Project. Visual effects would also result from inspection and maintenance activities producing traffic and dust on access roads. However, maintenance roadways would be adjacent to existing roads or located within the SPI forested lands, use of which would be consistent with existing road uses. Therefore, visual impacts would be noticeable, but not adverse. Impacts related to operation and maintenance of the diversion dam, powerhouse, switchyard, and substation would be less than significant.

Transmission Line

Power generated from the Proposed Project would be transmitted from the new substation via an approximately 12–mile long 60 kV transmission line within a 40–foot wide ROW easement to the point of interconnection (POI) on the PG&E 60 kV Volta–South transmission line in the town of Manton. The transmission line would be supported by both poles and composite 'H' towers (see example image below). A total of 100 to 135 composite poles and 10 to 15 composite 'H' towers, depending on final layout, would be required. Heights would range from 60 to 90 feet above grade.

The transmission line and appurtenant facilities would be located entirely on private lands with the exception of approximately 2 miles of transmission line, which would be located within the Tehama County road ROW on Hazen and South Powerhouse Roads (KVA 2 and KVA 3). The residents of Manton, most of whom are located on the western portion of the Proposed Project site, would be the most affected viewer group. Both long distance and near distance views of the transmission line, towers, and poles, would be experienced, as discussed below.

Long Distance Views

The residents of Manton would notice a visual change in long distance views of the hillsides to the east. The transmission line supported by poles and towers would be seen silhouetted against the sky. The closest tower to the nearest residence is over five miles away. With implementation of Visual Quality Measures 1 and 2, long distance visual impacts would be minimized to the extent possible. Visual Quality Measure 1 requires that over–story vegetation is removed by thinning and removing trees from the edge of the ROW to give a natural appearance. This would include selective thinning and removal to minimize the man–made appearance of a linear ROW. Visual Quality Measure 2 requires the use of composite poles and towers, as opposed to steel, to help blend in and be more consistent with the surrounding vegetation and hillsides. Although residents would have long distance views of individual poles and the transmission line, given the distance involved and intervening vegetation located

immediately adjacent to most residences, long distance views of the transmission line would not result in substantial adverse changes to visual quality. Impacts related to long distance views would be less than significant.

Near Distance Views

As indicated in the discussion of KVA 2 and KVA 3, residents located along Hazen Road and South Powerhouse Road would have near–distance views of the transmission line. It should be noted that to address the concerns of the residents of Manton related to the transmission line, Rugraw relocated the originally proposed alignment to limit the number of residents who would be affected. It is expected that viewers from KVA–2 would have a partially screened view toward the transmission line, but the visibility would be high due to the close distance of the view. The visibility of the transmission line from KVA–3 would be moderate due to the existing vegetation providing some screening and the close distance of the view. No towers are proposed near existing residences.

Although existing mature trees and other vegetation between the transmission line and residences would screen most views, the addition of a man–made structure to the existing rural visual environment experienced by residents would be considered adverse. The route was adjusted to limit impacts as much as possible, but there are no measures available that would reduce the impact to less than significant. Therefore, the addition of the transmission line would be considered a significant and unavoidable impact.

Construction Impacts – All Proposed Project Components:

- **Level of Significance:** Less Than Significant Impact
- **Mitigation Measures:** None required

Operation and Maintenance Impacts – Diversion Dam, Powerhouse, Switchyard, and Substation:

- **Level of Significance:** Less Than Significant Impact
- **Mitigation Measures:** None required

Operation and Maintenance Impacts – Transmission Line:

- **Level of Significance:** Significant and Unavoidable
- **Mitigation Measures:** None available

4.3.4.4 Impacts Related to New Light Sources

IMPACT 4.3–4: Would the project create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?

Construction

The predominant on–site construction activities, and work requiring excavation or grading, would take place in the spring, summer, and early fall. Construction is proposed to occur between 7 AM and 7 PM Monday through Friday. Potential sources of temporary daytime glare

could be created during construction by the operation of equipment. Solar reflection from glass windshields may be noticeable particularly emitted from the multipurpose use areas. Nighttime lighting associated with construction activities could also be required. The residents of Manton, most of whom are located on the western portion of the Proposed Project site, would be the most affected viewer group. Construction of the transmission line adjacent to the residences would generate nighttime light. Existing mature trees and other vegetation between the transmission line and residences would block most views, minimizing potential light and glare impacts. In addition, any light or glare created from construction–related activities under the Proposed Project would be short–term and temporary. Construction–related impacts of the Proposed Project would be less than significant.

Operation and Maintenance

Security lighting associated with Proposed Project facilities including the powerhouse, switchyard, and substation, would be a permanent year–round source of nighttime lighting. However, these Proposed Project facilities would not be visible to residents because the Proposed Project site is within a deeply incised valley. In addition, no developed recreation sites or specific recreational land use designations lie within Proposed Project lands or within 1 mile of Proposed Project facilities. Therefore, potential increases in light and glare during operation and maintenance would not result in adverse impacts to nighttime views in the surrounding areas. The impact would be less than significant.

Construction Impacts

- **Level of Significance:** Less Than Significant Impact
- **Mitigation Measures:** None required

Operation and Maintenance Impacts

- **Level of Significance:** Less Than Significant Impact
- **Mitigation Measures:** None required

4.3.5 References

CAL FIRE (California Department of Forestry and Fire Protection). 2020. California Board of Forestry and Fire Protection Bills, Rules, and Annual California Forest Practice Rules. Found at: https://bof.fire.ca.gov/

Rugraw, LLC (Rugraw). 2014. FERC Application for License, Lassen Lodge Hydroelectric Project, Exhibit E – Environmental Report.

Tehama County. 2009. Tehama County General Plan. March 2009. Found at: www.co.tehama.ca.us.

4.4 Agricultural and Forest Resources

This section addresses potential impacts to agriculture and forestry resources that could result from construction, operation, and maintenance of the Proposed Project. If necessary, mitigation measures are identified for significant impacts.

4.4.1 Environmental Setting

4.4.1.1 Regional Setting

The Proposed Project is located on the northeast side of unincorporated Tehama County. The northeast side of Tehama County is largely dominated by forestry, rural development, and open space uses. The land cover is mostly forested or shrub/scrub vegetation, with some areas of grassland, developed open space, and low and medium intensity development. The forested areas are characterized by past and ongoing logging activity and fires (FERC, 2018). The Proposed Project site and construction areas are located on land owned by Sierra Pacific Industries (SPI), Tehama County, and other private landowners. The Proposed Project area is zoned mostly Timber Production Zone (TPZ) with a small area zoned Upland Agriculture, Natural Resource, Public, and Residential. A portion of the land zoned Upland Agriculture is under Williamson Act Contract (Tehama County Public Works 2020).

4.4.2 Regulatory Setting

4.4.2.1 Federal

There are no applicable federal regulations regarding agricultural resources.

4.4.2.2 State

California's Public Resources Code (PRC) and Government Code (Gov. Code) provide applicable definitions to support the CEQA analysis of agriculture and forestry resources.

> *PRC section 12220(g) "Forest land" is land that can support 10–percent native tree cover of any species, including hardwoods, under natural conditions, and that allows for management of one or more forest resources, including timber, aesthetics, fish and wildlife, biodiversity, water quality, recreation, and other public benefits.*
>
> *PRC section 4526 "Timberland" means land, other than land owned by the federal government and land designated by the board [of Forestry and Fire Protection] as experimental forest land, which is available for, and capable of, growing a crop of trees of a commercial species used to produce lumber and other forest products, including Christmas trees. Commercial species shall be determined by the board on a district basis.*
>
> *Gov. Code section 51104(g) "Timberland production zone" or "TPZ" means an area which has been zoned pursuant to Section 51112 or 51113 and is devoted to and used for growing and harvesting timber, or for growing and harvesting timber and compatible uses, as defined in subdivision (h).*

California Land Conservation Act

The California Land Conservation Act, also known as the Williamson Act, allows for landowners to enter into agreements with local governments to preserve agricultural land. The agreement prohibits the conversion of agricultural land for other uses and in return the landowner's property taxes are lowered. Lands that are under Williamson Act Contracts are subject to certain restrictions (Tehama County 2009).

Farmland Mapping and Monitoring Program

The California Department of Conservation's Farmland Mapping and Monitoring Program (FMMP) provides designations for classifications of farmland throughout the state and produces maps and statistical data used for analyzing impacts on California's agricultural resources. Agricultural land is classified according to soil quality and irrigation status, with the categories being Prime Farmland, Farmland of Statewide Importance, Unique Farmland, Grazing Land, Urban and Built–Up Land, and Other Land.1 (DOC DLRP 2019). These are defined as follows:

Prime Farmland

Farmland with the best combination of physical and chemical features able to sustain long term agricultural production. This land has the soil quality, growing season, and moisture supply needed to produce sustained high yields. Land must have been used for irrigated agricultural production at some time during the four years prior to the mapping date.

Farmland of Statewide Importance

Farmland similar to Prime Farmland but with minor shortcomings, such as greater slopes or less ability to store soil moisture. Land must have been used for irrigated agricultural production at some time during the four years prior to the mapping date.

Unique Farmland

Farmland of lesser quality soils used for the production of the state's leading agricultural crops. This land is usually irrigated, but may include non–irrigated orchards or vineyards as found in some climatic zones in California. Land must have been used for production of high–value crops at some time during the four years prior to the mapping date.

Farmland of Local Importance

Land of importance to the local agricultural economy as determined by each county's board of supervisors and a local advisory committee. In some counties, Confined Animal Agriculture facilities are part of the Farmland of Local Importance, but they are shown separately.

Grazing Land

Land on which the existing vegetation is suited to the grazing of livestock. This category was developed in cooperation with the California Cattleman's Association, University of California Cooperative Extension, and other groups interested in the extent of grazing activities.

Urban and Built–up Land

Land occupied by structures with a building density of at least 1 unit to 1.5 acres, or approximately six structures to a 10–acre parcel. This land is used for residential, industrial, commercial, construction, institutional, public administration, railroad and other transportation yards, cemeteries, airports, golf courses, sanitary landfills, sewage treatment, water control structures, and other developed purposes.

Other Land

Land not included in any other category.

4.4.2.3 Local

The 2009 Tehama County General Plan governs the land use and development in the Proposed Project area. The General Plan policies and implementation measures applicable to agriculture and forestry resources include:

- *Policy AG–1.1:* Tehama County shall provide for the protection of agricultural lands from nonagricultural development pressures and uses that will adversely impact or hinder existing or foreseeable agricultural operations through a separation utilizing natural buffers and land use transition areas that mitigate or prevent land use conflicts with the development interest providing the buffers.
- *Policy AG–2.1:* Tehama County shall provide for the conservation of commercial timberland resources and related habitat.
  - *Implementation Measure AG–2.1a:* The Timberlands land use category shall be used to identify and protect lands currently under Timber Production Zoning.
  - *Implementation Measure AG–2.1b:* Development of Timberlands shall be subject to the conditions established in the Zoning Code.

Tehama County has a total of 239,448 acres of land with the Timber Land Use Designation (Tehama County 2009). The Tehama County Charter and Code prescribes the County Zoning Designations and allowed uses for each district. The General Plan Land Use Designations are compatible with the Zoning Designations (Tehama County 2009). Per Tehama County Title 17 – Zoning, high voltage transmission lines are an allowed use in all zone districts provided they secure an approved Use Permit (Tehama County Charter and Code 1984). For more details refer to *Section 4.14, Land Use and Planning*, which identifies applicable policies and rules and demonstrates Proposed Project conformity with the local regulatory setting.

4.4.3 Analysis Methodology

CEQA Appendix G describes that, “In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state’s inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment project; and forest carbon

measurement methodology provided in Forest Protocols adopted by the California Air Resources Board."

4.4.3.1 Analytical Approach

For this analysis, the Proposed Project was compared to applicable agricultural and forestry regulations from the General Plan, Zoning Code, and Williamson Act Program requirements. This analysis was used to demonstrate the consistency of the Proposed Project with the regulatory setting. This analysis determines if the Proposed Project will generate any significant impacts to agriculture and forestry resources. The area of assessment for this project is the agricultural and forested lands the Proposed Project would directly impact within the Proposed Project boundary (Figure 2–1), as well as any state or regional agricultural and forestry industries the Proposed Project would indirectly affect.

The Land Evaluation & Site Assessment (LESA) Model was not used for the analysis. The LESA Model is useful for determining the effects of a project on agricultural land (DOC DLRP 2019). The proposed transmission line corridor would cross two parcels for a total of about 1,700 feet. Since this would not adversely impact the land's ability to perform agricultural functions, the LESA Model was not necessary or required for the analysis of Proposed Project impacts.

4.4.3.2 Criteria for Determining Significance

According to Appendix G of the 2020 CEQA Guidelines, the Proposed Project would have an impact if it would:

- 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;
- Conflict with existing zoning for agricultural use, or a Williamson Act contract;
- Conflict with existing zoning for, or cause rezoning of, forest land (as defined in PRC section 12220(g)), timberland (as defined by PRC section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g));
- Result in the loss of forest land or conversion of forest land to non–forest use; 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 or conversion of forest land to non–forest use.

4.4.4 Environmental Impacts and Mitigation

The Proposed Project does not include any environmental measures that specifically address agriculture and forestry resources. However, Rugraw–proposed measures and plans address related resources, and are discussed in the environmental analysis as appropriate.

4.4.4.1 Impacts Related to Farmland

IMPACT 4.4–1: Would the project 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?

Construc*tion, Operation, and Maintenance*

Per the FMMP, the Proposed Project is sited entirely on land classified as Grazing Land (Farmland Finder 2016), including the two parcels the transmission line would cross. This would not affect the land's ability to allow for grazing. The Proposed Project would not impact Prime Farmland, Unique Farmland, or Farmland of Statewide Importance. Therefore, impacts related to construction, operation, and maintenance would have no impact to important farmlands.

Construction, Operation, and Maintenance Impacts

- **Level of Significance:** No Impact
- **Mitigation Measures:** None required

4.4.4.2 Impacts Related to Agricultural Zoning

IMPACT 4.4–2: Would the project conflict with existing zoning for agricultural use, or a Williamson Act contract?

The Proposed Project crosses through land zoned AG–1 (Agricultural, Upland District). Per the Tehama County Charter and Code Chapter 17.10 land zoned AG–1 is primarily used for grazing of livestock. Additional allowed uses include mineral exploration and recreational uses (Tehama County Charter and Code 1984). For more details refer to EIR Section 4.14, Land Use and Planning, which demonstrates conformity with local zoning regulations.

A portion of the land zoned AG–1 is under Williamson Act contract (Tehama County Public Works 2020). The Williamson Act allows for landowners and local governments to enter into a contract to preserve agricultural land and lower landowner's property taxes. The contract subjects the land to certain restrictions including prohibiting the conversion of agricultural land for other uses (Tehama County 2009).

Construction

A section of the Proposed Project's transmission line, about 1.75 miles of the 12–mile line, crosses through land zoned AG–1 and a portion of this land is under a Williamson Act contract (Tehama County Public Works 2020). The predominant on–site construction activities, and any work requiring excavation or grading, would take place in the later spring, summer, and early fall, between approximately April 15 and October 15. . This construction timeframe reflects the entire project, so the actual construction occurring on agricultural and Williamson Act contract lands would be considerably shorter. Construction of the transmission line would include installation of poles and the overhead line. Each pole installation would result in less than 1 cubic yard of soil disturbance. For line installation there would be a temporary transmission line

pulling site with tensioning equipment. In cases where existing roads cannot be used the pole may be helicopter set to limit land disturbance. The construction of the transmission line would require temporary vehicle and equipment use. Rugraw proposes various measures that would minimize the impact of the Proposed Project's construction on land use. These measures include using existing roadways whenever possible and restoring vegetation disturbed in the construction process. See Impact 4.4–4 below for additional measures. Implementation of these construction measures would minimize short–term impacts to agricultural and Williamson Act contract lands. Additionally, the construction of the transmission line would disturb relatively little area and construction would occur over a short time period. The Proposed Project's short–term construction–related impact on lands zoned for agricultural use and Williamson Act contract lands would be less than significant.

Operation and Maintenance

The daily operation of the Proposed Project would not require use of these agricultural and Williamson Act contract lands, aside from the transmission line itself. The primary use of AG–1 lands is grazing. The transmission line, including poles and line, would not create a large area of land to be converted to non–agricultural use. Grazing could still occur around the pole sites. Since the Proposed Project would not inhibit grazing, there would be no conflict with this zoned use.

Access on these lands may be required during periodic maintenance of the transmission line, including vegetation management. Vegetation management inspections would be conducted yearly and clearing would be done every other year, or more if necessary. Clearing would be done as efficiently as possible and vehicle trips would occur on existing roads whenever possible thus minimizing impacts.

Additionally, the Tehama County Charter and Code Section 17.70 – Use Permits allows for high–voltage facilities in any zone district as long as a Use Permit is obtained (Tehama County Charter and Code 1984). Rugraw has applied for the appropriate permits to construct, operate and maintain the Proposed Project (refer to *Section 4.14, Land Use*).

Operation the Proposed Project, specifically the transmission line, is the only Project component that traverses a small portion of private property under Williamson Act contract. Traversing agricultural properties is acceptable with a Use Permit, for which Rugraw has applied. Given the low operation and maintenance requirements, the Proposed Project would not conflict with the use of the property for grazing uses. There would be a less than significant impact on existing zoning for agricultural use and Williamson Act contract land. No mitigation measures are required.

Construction Impacts

- **Level of Significance:** Less Than Significant Impact
- **Mitigation Measures:** None required

Operation and Maintenance Impacts

- **Level of Significance:** Less Than Significant Impact
- **Mitigation Measures:** None required

4.4.4.3 Impacts Related to Forest Land and Timberland Zoning

IMPACT 4.4–3: Would the project 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))?

Construction, Operation, and Maintenance

Tehama County has a total of 239,448 acres of land with the Timber Land Use Designation (Tehama County 2009). The majority of the Proposed Project site is located on SPI property, which is zoned TPZ. Rugraw estimates permanent removal of approximately 69 acres of vegetation and temporary disturbance of 11.37 acres. These estimates are for the entire Proposed Project area, not all of which is forested, and the Right–of–Way (ROW) clearance for the 12–mile long transmission line is included in this acreage. Approximately 44 of the 69 acres of permanent vegetation disturbance is forested (FERC 2018). As a percentage of timber lands, this loss will represent less than 3 percent of the total acreage of land with Timber Land Use Designation in Tehama County.

Pursuant to Government Code section 51104(g), Timber Production lands are dedicated to timber production, harvest, and any other compatible uses. Tehama County Charter and Code section 17.70, Use Permits, allows for high–voltage facilities in any zone district as long as a Use Permit is obtained (Tehama County Charter and Code 1984). Rugraw has applied for a Use Permit to allow for construction and operation of the Proposed Project. Additionally, the Proposed Project requires a building permit (Title 17 section 15.02.310 – Permits) and an encroachment permit (Title 17 section 16.50.030 – Encroachment permit fee) to address construction roadway work and any obstructions to flow of traffic (Tehama County Code and Charter 1984). Rugraw has applied for the appropriate permits to construct, operate and maintain the Proposed Project (refer to *Section 4.14, Land Use*).

Therefore, the Proposed Project would have a less than significant impact. No mitigation is required.

Construction, Operation, and Maintenance Impacts

- **Level of Significance:** Less Than Significant Impact
- **Mitigation Measures:** None required

4.4.4.4 Impacts Related to Loss of Forest Land

IMPACT 4.4–4: Would the project result in the loss of forest land or conversion of forest land to non–forest use?

Construction, Operation, and *Maintenance*

Timber harvest in Tehama County has fluctuated from a high of 93,066 million board feet (MBF)[11] in 2013 to a low of 18,911 MBF in 2015 (University of Montana, 2020). The majority of timber harvest occurs on privately–owned land and Native American tribes/tribal land. The latest timber harvest data indicates 20,833 MBF was harvested in 2019. The majority of the Proposed Project site is located on SPI property, which is zoned TPZ. Rugraw estimates permanent removal of approximately 69 acres of vegetation, not all of which are forest lands. Approximately 44 of the 69 acres of permanent vegetation that would be removed is forested (FERC, 2018). As a percentage of timber lands, this loss would represent less than 3 percent of the total acreage of land with a Timber Land Use Designation in Tehama County. The loss of 44 acres is not expected to alter Tehama County's timber resource capabilities. In addition, the proposed transmission line right–of–way, where the majority of tree removal would occur, would provide a fuel break and improved access for wildland fire control, and thus help overall forest resources. The new right–of–way would also improve the ability of SPI to manage and extract forest resources in the Proposed Project area. This impact would be less than significant.

To further reduce Proposed Project impacts to forest lands, Rugraw has proposed to implement the following construction measures that would generally minimize the loss and conversion of forest land:

- General Construction Measures
  - Limit land disturbance and vegetation clearing to those areas needed for construction. Delineate the limits of construction, work areas, and multipurpose areas with flagging, fencing, and/or stakes to prevent land–disturbing activities outside of construction areas.
  - Stockpile natural topsoils and replace, regrade, and revegetate disturbed areas, in accordance with California forestry regulations and best practices, with native vegetation. Restore disturbed stream and riparian habitat to pre–construction conditions and with riparian plantings and/or seeding, where applicable, with seed mixes recommended by CDFW.
  - Use existing roads to the maximum possible extent, constructing new access roads only when necessary; limit access roads to a width of 12 feet whenever possible; and surface permanent roads with gravel to a depth and quantity sufficient to maintain a stable road surface and minimize erosion and dust.

Implementation of these measures would further limit vegetation removal and disturbance. Temporary disturbances would be mapped and quantified to facilitate post–construction restoration of the area. These measures would minimize the effects of overall vegetation

[11] The board–foot is a unit of measurement for the volume of timber in the United States. It is the volume of a one–foot length of a board that is one–foot wide and one–inch thick.

removal. Overall, the loss of approximately 44 acres of forested land would be considered a small percentage (less than 3 percent) of the total forest land in Tehama County.

Because of the relatively small amount forest land that would be converted, the impact would be considered less than significant. Additionally, the Rugraw–proposed construction practices, which are part of the Proposed Project, further lessen the potential for impacts. No mitigation is required.

Refer to *Section 4.7, Biological Resources – Terrestrial* for additional information regarding vegetation removal.

Construction, Operation, and Maintenance Impacts

- **Level of Significance:** Less Than Significant Impact
- **Mitigation Measures:** None required

4.4.4.5 Impacts Related to Conversion of Farmland

IMPACT 4.4–5: Would the project 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?

Construction, Operation, and Maintenance

The Proposed Project area is limited to that discussed above and would not involve any additional changes to the existing environment that are not already discussed. There are no other anticipated land use conversion actions as a direct or indirect result of this Proposed Project. No impact would occur. No mitigation is required.

Construction, Operation, and Maintenance Impacts

- **Level of Significance:** No Impact
- **Mitigation Measures:** None required

4.4.5 References

California Department of Conservation. 2016. California Important Farmland Finder. Found at: maps.conservation.ca.gov

California Department of Conservation, Division of Land Resource Protection. 2019. Found at: www.conservation.ca.gov

Federal Energy Regulatory Commission. 2018. Final Environmental Impact Statement for Hydropower License: Lassen Lodge Hydroelectric Project—FERC Project No. 12496–002—California. Prepared by FERC, Washington, D.C.

Tehama County. 1984. Tehama County Charter and Code. Found at: library.municode.com

Tehama County. 2009. Tehama County, General Plan Update, 2009–2029. Prepared by PMC, Chico, California. Found at: www.co.tehama.ca.us

Tehama County Public Works. 2020. Tehama County Regional Viewer, Interactive Map. Found at: planningsites.org

University of Montana, Bureau of Business and Economic Research. 2020. 2020 Forest Industry Research Program, Harvest and Industry, Tehama County, California. Found at: www.bber.umt.edu

4.5 Air Quality

This section discusses potential air quality impacts from construction, operations and maintenance of the Proposed Project. The Proposed Project would supply renewable energy to end users in the state. An average of approximately 25,000 MWh of hydroelectric power would be generated annually, which could replace power generation from fossil–fuel energy sources. The Proposed Project's effect on energy resources is addressed in Section 4.9.

The air quality analysis is based on review of existing resources, technical data, and applicable laws and regulations.

4.5.1 Environmental Setting

4.5.1.1 Air Pollutants of Concern

Criteria Air Pollutants

Air pollution contributes to a wide variety of adverse health and environmental effects. The US Environmental Protection Agency (USEPA) and the California Air Resources Board (CARB) has established health–based ambient air quality standards for the six most common pollutants, referred to as "criteria" air pollutants. These criteria air pollutants include ground–level ozone (O_3); particulate matter, including coarse particulate matter (PM_{10}) and fine particulate matter ($PM_{2.5}$); nitrogen dioxide (NO_2); carbon monoxide (CO); sulfur dioxide (SO_2), and lead (Pb). Ozone is not directly emitted into the air but rather forms in the atmosphere through chemical and photochemical reactions of reactive organic gases (ROG) and nitrogen oxides (NO_X). Therefore, ozone is indirectly controlled through limits on emissions of ROG and NO_X.

Toxic Air Contaminants

A toxic air contaminant (TAC) is "an air pollutant that may cause or contribute to an increase in mortality or an increase in serious illness, or which may pose a present or potential hazard to human health" (HSC 1993). CARB has identified over 200 substances as TACs. The majority of health risks from TACs are attributed to relatively few compounds, which include particulate matter from diesel–fueled engines. Diesel particulate matter (DPM) was identified as a TAC by CARB in 1998. A majority of the particles emitted from diesel–fueled equipment exhaust are 10 microns or less in diameter. The small particle size means the diesel compounds can be inhaled and trapped in the lungs which can affect overall human health.

Odors

Odors are substances in the air that pose a nuisance to nearby land uses such as residences, schools, daycare centers, and hospitals. Odors are typically not a health concern, but can interfere with the use and enjoyment of nearby property.

Odors may be generated by a wide variety of sources. Examples of facilities and operations that may generate significant odors include landfills, wastewater treatment plants, food processing facilities, and chemical manufacturing. Objectionable odors created by a facility or operation may cause a nuisance or annoyance to surrounding populations.

4.5.1.2 Regional Setting

The Proposed Project is located in Tehama County, which is situated in the Northern Sacramento Valley Air Basin (NSVAB) also known as the Northern Sacramento Valley Planning Area (NSVPA). The NSVAB is bound on the north and west by the Coastal Mountain Range, on the east by the southern portion of the Cascade Mountain Range, and on the north by the Sierra Nevada Mountains. The height of these mountain ranges can climb to 6,000 feet above mean seal level (msl) with individual peaks reaching higher. The height of these mountain ranges combined with the lower valley floor of the NSVAB create a bowl shape in which temperature inversions occur.

Temperature inversions prevent vertical dilution of pollutants and generally occur when the weather is warm and the wind is light. In the NSVAB, summers are normally dry and warm with most of the precipitation occurring from December to March. Summer inversions happen during the day and intensify during the afternoon, while winter inversions occur at night but are usually eliminated by warmer daytime temperatures. Both inversions can take place any time of the year and in the fall may coexist to produce the heaviest pollutant potential. Temperature inversions can act like a lid on a bowl, trapping pollutants generated locally and transported in from the broader Sacramento area. These trapped pollutants can lead to unhealthy levels of air pollution.

Attainment Status of Tehama County

Areas throughout the state are either designated as attainment, nonattainment, or unclassified for the ambient air quality standards (AAQS) established by the USEPA and CARB. Generally, attainment means that an area meets the AAQSs. Nonattainment refers to an area that exceeds the AAQSs. Unclassified means that there is not sufficient data to make a determination. Designations are dependent upon the number of times the pollutant is exceeded. The USEPA and CARB make area designations for the six criteria air pollutants, with CARB setting designations for three additional pollutants (i.e., sulfates, hydrogen sulfide, and visibility reducing particles). Table 4.5–1 shows the air quality attainment designations for Tehama County.

Table 4.5–1. Tehama County Federal and State Air Quality Attainment Designations

Criteria Pollutants	Federal Attainment Designation	State Attainment Designation
Ozone (O_3)	Unclassified/Attainment	Nonattainment
Coarse Particulate Matter (PM_{10})	Unclassified	Nonattainment
Fine Particulate Matter ($PM_{2.5}$)	Unclassified/Attainment	Unclassified
Nitrogen Dioxide (NO_2)	Unclassified/Attainment	Attainment
Carbon Monoxide (CO)	Unclassified/Attainment	Unclassified
Sulfur Dioxide (SO_2)	Unclassified/Attainment	Attainment
Lead	Unclassified/Attainment	Attainment
Sulfates	——	Attainment
Hydrogen Sulfide	——	Unclassified
Visibility Reducing Particles	——	Unclassified

Source: CARB 2018

As shown in Table 4.5–1, Tehama County is state designated "nonattainment" for O_3 and PM_{10} and is "unclassified and/or in attainment" for all other criteria pollutants for both the state and national AAQSs.

Sensitive Receptors

Certain population groups are considered more sensitive to air pollutants than others; in particular, children, elderly, and acutely ill and chronically ill persons, especially those with cardiorespiratory diseases such as asthma and bronchitis. Sensitive receptors (land uses) indicate locations where such individuals are typically found, namely schools, day care centers, hospitals, convalescent homes, residences of sensitive persons, and parks with active recreational uses, such as youth sports.

Persons engaged in strenuous work or physical exercise also have increased sensitivity to poor air quality. Residential areas are considered more sensitive to air quality conditions than commercial and industrial areas because people generally spend longer periods of time at their residences, resulting in greater exposure to AAQS. Recreational uses like parks are also considered sensitive due to the greater exposure to AAQS, and because the presence of pollution detracts from the recreational experience.

The residents of Manton located on the western portion of the Proposed Project site would be considered sensitive receptors. The nearest residence are located approximately 100 feet away from the transmission line route along Rolling Hills Road and the transmission line and helicopter landing and take–off area (Multipurpose Area Number 4) adjacent to South Powerhouse Road. Other residences along South Powerhouse Road and Hazen Road are located approximately 200 feet of the transmission line route. The closest school, Manton Elementary, is approximately 0.6 mile north of the closest point of the transmission line. The town of Mineral is approximately 4 miles from the eastern part of the Proposed Project at the diversion dam site, but no sensitive receptors are in close proximity. No other sensitive receptors such as motels and hotels, libraries, religious institutions, hospitals, and nursing homes are in the vicinity of the Proposed Project.

4.5.2 Regulatory Setting

4.5.2.1 Federal

The federal Clean Air Act (federal CAA) was passed by Congress in 1970 and last amended in 1990. The federal CAA gives the federal government authority, by way of the USEPA, to establish air quality standards. The USEPA is responsible for implementing most aspects of the federal CAA, including setting National Ambient Air Quality Standards (NAAQS) for major air pollutants; setting hazardous air pollutant standards; approving state attainment plans; setting motor vehicle emission standards; issuing stationary source emission standards and permits; and establishing acid rain control measures, stratospheric O_3 protection measures, and enforcement provisions. NAAQS are established for the six criteria air pollutants under the CAA: O_3, CO, NO_2, SO_2, PM (PM_{10} and $PM_{2.5}$), and lead.

The NAAQS describe acceptable air quality conditions designed to protect the health and welfare of the citizens of the nation. The federal CAA requires the USEPA to reassess the

NAAQS at least every 5 years to determine whether adopted standards are adequate to protect public health based on current scientific evidence. States with areas that exceed the NAAQS must prepare a state implementation plan (SIP) that demonstrates how those areas will attain the standards within mandated time frames. In March 2017, California adopted the *State Strategy for the State Implementation Plan* described below.

4.5.2.2 State

State Implementation Plan

California's SIP describes the commitment to achieve reductions necessary from mobile sources, fuels, and consumer products to meet federal O_3 and $PM_{2.5}$ standards over the next 15 years. The SIP proposes a suite of regulatory and incentive programs, referred to as State SIP measures, which, in combination with local actions, are designed to achieve the required emission reductions to meet federal air quality standards.

California Clean Air Act

The federal CAA delegates the regulation of air pollution control and the enforcement of the NAAQS to the states. In California, the task of air quality management and regulation has been legislatively granted to CARB, with subsidiary responsibilities assigned to air quality management districts and air pollution control districts at the regional and county levels. CARB, which became part of the California Environmental Protection Agency in 1991, is responsible for ensuring implementation of the California Clean Air Act (California CAA) of 1988, responding to the federal CAA, and regulating emissions from motor vehicles and consumer products.

CARB has established California Ambient Air Quality Standards (CAAQS), which are generally more restrictive than the NAAQS. The CAAQS describe adverse conditions; that is, pollution levels must be below these standards before a basin can attain the standard. The NAAQS and the CAAQS have been developed to protect human health and represent the maximum acceptable concentrations of air pollution. The state and federal AAQS are presented in Table 4.5–2 below.

Table 4.5–2. Ambient Air Quality Standards

Pollutant	Averaging Time	CAAQS[a]	NAAQS[b] Primary[c]	NAAQS[b] Secondary[d]
Ozone (O_3)[e]	1–hour	0.09 ppm	—	—
Ozone (O_3)[e]	8–hour	0.070 ppm	0.070 ppm	0.070 ppm
Nitrogen Dioxide (NO_2)	1–hour	0.18 ppm	0.100 ppm	—
Nitrogen Dioxide (NO_2)	Annual Arithmetic Mean	0.030 ppm	0.053 ppm	0.053 ppm
Sulfur Dioxide (SO_2)	1–hour	0.25 ppm	0.075 ppm	—
Sulfur Dioxide (SO_2)	3–hour (secondary)[1]	—	—	0.5 ppm
Sulfur Dioxide (SO_2)	24–hour	0.04 ppm	0.14 ppm (for certain areas)	—

Pollutant	Averaging Time	CAAQS[a]	NAAQS[b] Primary[c]	NAAQS[b] Secondary[d]
Sulfur Dioxide (SO_2)	Annual arithmetic mean	—	0.030 ppm (for certain areas)	—
Carbon Monoxide (CO)	1–hour	20 ppm	35 ppm	—
Carbon Monoxide (CO)	8–hour	9.0 ppm	9 ppm	—
Carbon Monoxide (CO)	Lake Tahoe (8–hr)	6 ppm	—	—
Respirable Particulate Matter (PM_{10})[f]	24–hour	50 µg/m^3	150 µg/m^3	150 µg/m^3
Respirable Particulate Matter (PM_{10})[f]	Annual Arithmetic Mean	20 µg/m^3	—	—
Fine Particulate Matter ($PM_{2.5}$)[f]	24–hour	—	35 µg/m^3	
Fine Particulate Matter ($PM_{2.5}$)[f]	Annual Arithmetic Mean	12 µg/m^3	12.0 µg/m^3	15 µg/m^3
Lead[h, i]	30–day Average	1.5 µg/m^3	—	—
Lead[h, i]	Calendar Quarter	—	1.5 µg/m^3 (for certain areas)	1.5 (for certain areas)
Lead[h, i]	Rolling 3–Month Average	—	0.15 µg/m^3	0.15 µg/m^3
Sulfates[g]	24–hour	25 µg/m^3	—	—
Hydrogen Sulfide	1–hour	0.03 ppm	—	—
Vinyl Chloride[h]	24–hour	0.01 ppm	—	—
Visibility Reducing Particles	8–hour	See footnote j	—	—

Source: CARB 2016

Notes: µg/m^3 = microgram(s) per cubic meter
— = no standard has been adopted
ppm = part(s) per million

a. CAAQS for ozone, carbon monoxide (except 8–hour Lake Tahoe), sulfur dioxide (1 and 24 hour), nitrogen dioxide, and particulate matter (PM10, PM2.5, and visibility reducing particles), are values that are not to be exceeded. All others are not to be equaled or exceeded.

b. NAAQS (other than ozone, particulate matter, and those based on annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8–hour concentration measured at each site in a year, averaged over 3 years, is equal to or less than the standard. For PM10, the 24 hour standard is attained when the expected number of days per calendar year with a 24–hour average concentration above 150 µg/m3 is equal to or less than one. For PM2.5, the 24 hour standard is attained when 98 percent of the daily concentrations, averaged over 3 years, are equal to or less than the standard.

c. NAAQS Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.

d. NAAQS Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.
e. On October 1, 2015 the national 8–hour ozone primary and secondary standards were lowered from 0.075 to 0.070 ppm.
f. On December 14, 2012, the national annual PM2.5 primary standard was lowered from 15 µg/m3 to 12.0 µg/m3. The existing national 24–hour PM2.5 standards (primary and secondary) were retained at 35 µg/m3, as was the annual secondary standard of 15 µg/m3. The existing 24–hour PM10 standards (primary and secondary) of 150 µg/m3 also were retained. The form of the annual primary and secondary standards is the annual mean, averaged over 3 years.
g. On June 2, 2010, a new 1–hour SO2 standard was established and the existing 24–hour and annual primary standards were revoked.
h. CARB has identified lead and vinyl chloride as 'toxic air contaminants' with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.
i. The national standard for lead was revised on October 15, 2008, to a rolling 3–month average.
j. In 1989, CARB converted both the general statewide 10–mile visibility standard and the Lake Tahoe 30–mile visibility standard to instrumental equivalents, which are "extinction of 0.23 per kilometer" and "extinction of 0.07 per kilometer" for the statewide and Lake Tahoe Air Basin standards, respectively.

Off–Road Regulation

CARB regulates mobile sources of air pollution in California, including self–propelled, off–road construction equipment. The Regulation for In–Use Off–Road Diesel–Fueled Fleets (Off–Road Diesel Regulation) applies to all self–propelled, off–road diesel vehicles 25 horsepower (hp) or greater used in California and most two–engine vehicles (except on–road two–engine sweepers). This includes rented and leased vehicles. The purpose of the Off–Road Diesel Regulation is to reduce emissions of NO_X and PM from off–road diesel vehicles. Compliance with the regulation includes:

- Labeling and reporting of all vehicles to CARB using the free online reporting tool, DOORS;
- Restricting the addition of older vehicles into fleets;
- Retiring, replacing, or repowering older engines, or installing Verified Diesel Emission Control Strategies (VDECS) by fleet owners to reduce their emissions;
- Imposing idling limits and requiring a written idling policy; and
- Requiring a disclosure when selling vehicles.

This regulation applies to the construction equipment used for this Proposed Project.

Portable Equipment Registration Program

The statewide Portable Equipment Registration Program (PERP) was established in 1997 to regulate portable engines 50 hp or greater and portable engine–driven equipment units. Owners or operators of portable engines and certain types of equipment can register their units under the PERP to operate their equipment anywhere in the state. Without PERP, equipment owners would be required to obtain an operating permit from each air district where the engine or equipment unit operates, potentially leading to multiple permits for one piece of equipment.

Equipment units are pieces of portable equipment that emit non–combustion–related particulate matter less than 10 microns in diameter (PM_{10}) and are used in activities that include, but are not limited to, confined and unconfined abrasive blasting, concrete batch plants, sand and gravel screening, rock crushing, wood chipping, and unheated pavement recycling and crushing. The PERP program works together with the Portable Engine Airborne Toxic Control Measure (ATCM), which establishes emissions requirements for portable engines to reduce exposure to DPM and protect public health.

4.5.2.3 Local

Tehama County Air Pollution Control District

The Tehama County Air Pollution Control District (TCAPCD) is responsible for planning, implementing, and enforcing federal and state AAQS within the Tehama County portion of the NSVAB. Tehama County is designated "nonattainment" for O_3 and PM_{10} for the CAAQSs. As part of its planning responsibilities, which include addressing air quality nonattainment issues, the TCAPCD developed the 1) Guidelines for Assessing Air Quality Impacts, 2) jointly prepared the NSVPA Triennial Air Quality Attainment Plan (AQAP), and 3) rules and regulations to regulate sources of air pollution.

Guidelines for Assessing Air Quality Impacts

The TCAPCD prepared Guidelines for Assessing Air Quality Impacts (GAAQI) (TCAPCD 2015) as an advisory document to help address potential air quality impacts from projects within its jurisdiction, and consistent with CEQA requirements. The GAAQI define the criteria used by the TCAPCD to determine when an air quality analysis is necessary, the type of analysis that should be performed, the significance of the impacts predicted by the analysis, and the mitigation measures needed to reduce overall air quality impacts. The GAAQI, including the recommended thresholds of significance, are being used to analyze the air quality impacts for this Proposed Project.

Air Quality Attainment Plan

The federal CAA requires air quality plans for areas classified as "nonattainment" for NAAQSs. The California CAA requires air districts to develop a plan for attaining the CAAQSs when their areas are designated "nonattainment" for O_3, CO, SO_2, or NO_2. Tehama County is state designated "nonattainment" for O_3 and PM_{10} and is "unclassified and/or in attainment" for all other criteria pollutants for both the state and federal AAQSs. Therefore, Tehama County is required to develop an air quality plan to identify how it will attain the state's O_3 standard. The California CAA does not require air quality plans for PM_{10} nonattainment. Rather PM_{10} emissions are addressed through local fugitive dust rules (see below).

The TCAPCD, along with other NSVPA air pollution control and air quality management districts, jointly prepared an AQAP that addresses how the area will attain the CAAQS for O_3. Updates to the AQAP are required every 3 years. The latest update is the NSVPA 2018 Triennial AQAP (2018 AQAP) that was approved by the Basin Control Council (BCC) on December 7, 2018 (SVAQEEP 2018).

O_3 reductions are primarily achieved by decreasing emissions of O_3 precursors ROG and NO_X. In the NSVPA, these emissions are caused by stationary sources (i.e., internal combustion

engines or boilers), mobile sources (i.e., cars, trucks, and trains), or area sources (i.e., consumer products or wildfires). Consequently, the 2018 AQAP focuses on adoption of stationary source and area wide control measures, incentive programs that target NO_X reductions from mobile sources, and education and information programs to help educate the public about the importance of reducing emissions at individual districts. The 2018 AQAP also references the use of local CEQA guidance (the TCAPCD GAAQI), and recognizes the importance of this guidance document as a tool for reducing ROG and NO_X emissions from individual projects.

TCAPCD Rules

In addition to the plans and guidelines described above, the TCAPCD establishes a number of rules to help control various sources of pollutant emissions. The following is a list of TCAPCD rules that could apply to this Proposed Project.

- TCAPCD Rule 4.4 Nuisance – This rule prohibits discharge of air contaminants from any source that cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public which cause or have a natural tendency to cause injury or damage to business or property.
- TCAPCD Rule 4:1 Visible Emissions – This rule prohibits the discharge of any air contaminants from any source, including stationary diesel–powered equipment, that exceed 40 percent opacity for more than 3 minutes in any 1 hour.
- TCAPD Rule 4:24 Fugitive Dust Emissions – The purpose of this rule is to control the amount of fugitive dust entrained in the atmosphere from significant man–made fugitive dust sources. This rule applies to any active operation, disturbed surface area, or man–made condition capable of generating fugitive dust, including bulk material handling, earthmoving, construction and demolition, storage piles, unpaved roads and track–out.

4.5.3 Analysis Methodology

This air quality evaluation was prepared in accordance with the requirements of CEQA to determine if the Proposed Project would result in significant air quality impacts from construction and operations. The GAAQI, developed by the TCAPCD, is used in this analysis as guidance for analyzing and mitigating air quality impacts. The area of assessment is the Northeastern Plateau Air Basin.

4.5.3.1 Analytical Approach

This analysis focuses on the air quality impacts from the Proposed Project's estimated construction–related emissions. Construction–related emissions are generally short–term in duration, but may still contribute to localized changes in ambient air quality under certain atmospheric conditions. Construction emissions largely result from fugitive dust from soil disturbance, fuel combustion from mobile heavy–duty diesel– and gasoline–powered equipment, portable auxiliary equipment, and worker commute trips.

Air quality emissions from Proposed Project operation and maintenance would also occur from vehicle trips and indirectly from energy use. Operation of the Proposed Project would involve up to four weekly vehicle trips with minimal energy needed for operation of Proposed Project facilities (e.g., lighting and equipment). Maintenance activities would require up to 24 vehicle

trips annually, over a 2– to 4–week period. The Proposed Project's low operation and maintenance needs would result in negligible air quality emissions. Furthermore, the Proposed Project would generate an average of 25,000 MWh of energy annually that will not produce air pollution or toxic byproducts and could replace and offset generation from air pollutant emitting energy sources. With the overall benefit of the Proposed Project operations, this analysis focuses on impacts from construction–related activities.

Construction Emissions

Excluding emissions from helicopter use, the Proposed Project's estimated construction emissions were quantified using the California Emissions Estimator Model (CalEEMod), Version 2016.3.2. This model uses widely accepted methodologies and data to quantify emissions estimates that include the: (1) USEPA AP–42 Emissions Factors, (2) CARB OFFROAD2011 emissions factors for off–road equipment and, (3) EMFAC2014 emissions factors for on–road vehicles.

Construction emissions input data include the Proposed Project–specific location information, equipment list and hours of operation, schedule, and estimated vehicle trip quantities and length (see Appendix B for detailed information). The predominant on–site construction activities, and any work requiring excavation or grading, would take place in the later spring, summer, and early fall, between approximately April 15 and October 15. Construction is proposed to occur between 7 AM and 7 PM Monday through Friday.

Helicopter Assumptions

A helicopter would be used to assist in the installation of transmission lines and poles at locations too difficult to reach by road. It is assumed than no more than one helicopter would be used at any one time, and would be operated 5 days per week throughout the entire construction season. The multipurpose area near the Old Highway 36 Bridge would serve as the landing site. The helicopter would return to Redding Airport or another appropriately equipped facility at the end of each day, and for re–fueling. The helicopter emissions were estimated manually using emissions factors from the Swiss Federal Office of Civil Aviation (FOCA) and are included in Appendix B.

4.5.3.2 Criteria for Determining Significance

Thresholds of Significance for Criteria Pollutants of Concern

The TCAPCD Guidelines contain numeric emissions thresholds for NO_X, ROG, and PM_{10} that apply to both construction and operational activities. This Proposed Project would emit negligible operation emissions and therefore, the following discussions pertain to the significance criteria and mitigation for construction–related activities.

The level of significance and required construction mitigation is tiered based on the amount of estimated emissions generated by a project. As outlined in the TCAPCD Guidelines, projects meeting Level A emissions thresholds for construction require the implementation of "Standard Mitigation Measures for Construction Equipment" and "Fugitive PM_{10} Mitigation Measures." Projects meeting Level B emissions thresholds require the implementation of mitigation required by Level A along with more extensive control measures, such as those identified as

"Discretionary Mitigation Measures for Construction Equipment" in the TCAPCD CEQA Guidelines, Section 6.2.

Projects meeting Level C emissions thresholds require the implementation of mitigation required by Level A and B along with any other feasible mitigation, including potential off–site mitigation to reduce impacts to a level of insignificance.

Table 4.5–3 presented below identifies the TCAPCD thresholds for determining levels of significance for project construction.

Table 4.5–3. Construction Thresholds of Significance for Criteria Pollutants of Concern

Pollutant	Level A	Level B	Level C
NO_X	≤ 25 lbs/day	> 25 lbs/day	> 137 lbs/day
ROG	≤ 25 lbs/day	> 25 lbs/day	> 137 lbs/day
PM_{10}	≤ 25 lbs/day	> 80 lbs/day	> 137 lbs/day
Level of Significance	Potentially Significant Impacts	Potentially Significant Impacts	Significant Impacts

Source: TCAPCD 2015

CEQA Guidelines Appendix G

Per the 2020 CEQA Guidelines Appendix G, the Proposed Project would result in a potentially significant air quality impact if it would:

- Conflict with or obstruct implementation of the Northern Sacramento Valley Planning Area 2018 Triennial AQAP;
- Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non–attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors ROG and NO_X, and PM_{10});
- Expose sensitive receptors to substantial TAC concentrations; or
- Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people.

4.5.4 Environmental Impacts and Mitigation

Rugraw The Proposed Project does not include any environmental measures that specifically address air quality–related impacts.

4.5.4.1 Impacts Related to the Air Quality Attainment Plan

IMPACT 4.5–1: Would the project conflict with or obstruct implementation of the Northern Sacramento Valley Planning Area 2018 Triennial Air Quality Attainment Plan?

Construction, Operation, and Maintenance

The federal CAA requires air quality plans in areas classified as "nonattainment" for NAAQSs. The California CAA requires air districts to develop air quality plans for attaining the CAAQSs when their areas are designated "nonattainment" for O_3, CO, SO_2, or NO_2. Tehama County is state designated "nonattainment" for O_3 and PM_{10} and is "unclassified and/or in attainment" for all other criteria pollutants for both the state and federal AAQSs. Therefore, Tehama County is required to develop an air quality plan to identify how it will attain the state's O_3 standard. The California CAA does not require air quality plans for PM_{10} nonattainment. Rather PM_{10} emissions are addressed through local fugitive dust rules.

The TCAPCD and NSVPA districts jointly prepared the 2018 AQAP. As stated in the AQAP, O_3 reductions are primarily achieved by decreasing emissions of O_3 precursors ROG and NO_X. In the NSVPA, these emissions are predominantly caused by stationary sources (i.e., stationary internal combustion engines or boilers), mobile sources (i.e., cars, trucks, and trains), or area sources (i.e., consumer products or wildfires). To reduce emissions from these sources, the AQAP focuses on adoption and implementation of stationary and area source measures, voluntary incentive programs for mobile sources, and educational and information programs to reduce emissions from transportation and area wide sources. While the Proposed Project does include both on–road and off–road mobile sources, the AQAP measures for mobile sources are voluntary and aimed at providing funding to replace or retrofit older vehicles and equipment. The Proposed Project mobile sources of emissions (other than construction–related, discussed below) would be considered minor and not contribute significantly to ROG and NO_X. No other AQAP sources are sources included as part of the Proposed Project. Therefore, the Proposed Project would not conflict or obstruct implementation with the attainment plan related to stationary sources.

Construction, Operation, and Maintenance Impacts

- **Level of Significance:** Less Than Significant Impact
- **Mitigation Measures:** None required.

4.5.4.2 Impacts Related to Criteria Pollutants

IMPACT 4.5–2: Would the project result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non–attainment under an applicable federal or state ambient air quality standard?

Construction

Proposed Project construction would result in a temporary increase in criteria pollutant emissions of NO_X, ROG, PM_{10}, and $PM_{2.5}$. Increased emissions would occur from engine exhaust during on–

road vehicle and haul trips, off–road construction equipment, helicopter operations, and fugitive dust generated during earthmoving activities and traveling on unpaved roads.

Table 4.5–4 summarizes the estimated maximum daily criteria pollutant emissions from the Proposed Project's construction–related activities. While construction emissions (only) for ROG and NO_X are under the Level A thresholds, and PM_{10} emissions are within the Level B thresholds, adding in the worst–case scenario emissions from helicopter operations increases all three pollutants.

Table 4.5–4. Estimated Maximum Daily Construction and Helicopter Emissions

Type of Activity	Criteria Pollutant (lbs/day) NO_X	Criteria Pollutant (lbs/day) ROG	Criteria Pollutant (lbs/day) PM_{10}	Criteria Pollutant (lbs/day) $PM_{2.5}$	Criteria Pollutant (lbs/day) CO
Construction Emissions[1]	20.46	2.33	40.39	4.89	18.98
Helicopter Emissions	88.83	25.61	15.70	3.78	27.13
Subtotal	*109.29*	*27.94*	*56.09*	*8.67*	*46.11*
Construction Emissions with Fugitive Dust Mitigation[2]	20.46	2.33	19.15	2.77	18.98
Helicopter Emissions with Fugitive Dust Mitigation[2]	88.83	25.61	8.42	3.05	27.13
Total w/Mitigation	109.29	27.94	27.57	5.82	46.11
TCAPCD Threshold Level[3]	**B**	**B**	**B**	**–**	**–**

1. Estimated maximum daily emissions are from the CalEEMod Summer Emissions Report
2. Fugitive dust mitigation, i.e., application of water by water truck, has been incorporated as mitigation during earthmoving, travel on unpaved roads, and during helicopter landing and take–off.
3. The TCAPCD does not have thresholds for PM2.5 or CO.

The total combined (Construction + Helicopter Emissions) maximum daily emissions estimates results in the Proposed Project being at the Level B threshold of significance. The TCAPCD measures a project's significance based on levels (A, B, and C) and Levels A and B are considered "potentially significant". Therefore, the Proposed Project would result in a potentially significant impact to PM_{10} and O_3.

To reduce the potentially significant impact associated with Project construction to PM_{10} and O_3, Rugraw has agreed[12] to implement construction–related air quality measures (Mitigation Measure AIR–1). Mitigation Measure AIR–1 requires actions consistent with TCAPCDs GAAQI, Sections 6.2 and 6.3 to water construction areas to reduce PM_{10} emissions and $PM_{2.5}$. Watering with a water truck would result in a reduction of PM_{10} emissions from 56.09 to 27.57 lbs/day, which is approximately a 50 percent decrease, and a reduction in $PM_{2.5}$ emissions from 8.67 to 5.82 lbs/day representing approximately 33 percent decrease.

Mitigation Measure AIR–1 also includes measures designed to mitigate combustion emissions from heavy–duty construction equipment and reduce emissions of ROG and NOx such as substituting gas–powered equipment with diesel–powered equipment. Actions required in AIR–

[12] Rugraw agreed to implement Mitigation Measure AIR–1 via email on September 7, 2020.

1 are consistent with the Standard and Discretional Measures identified for projects meeting level B thresholds in Section 4.5.3.2.

Implementation of mitigation measures AIR–1 would reduce impacts to $PM_{10,}$ $PM_{2.5}$, and O_3 to less than significant.

Operation and Maintenance

As described in detail above, the Proposed Project's low operation and maintenance needs would not result in a substantial and adverse amount of air pollutant emissions. Maintenance activities would occur over an approximate 2–week period once a year, at most. The primary air emissions would be associated with truck traffic, which would not create an exceedance of emissions thresholds. Operation of the Proposed Project would improve air quality with the annual average generation of 25,000 MWh of clean energy that does not generate air pollutants or toxic byproducts and would replace and offset generation from air pollutant emitting energy sources during operation and maintenance.

Due to the insignificant amount of air pollutants that would be emitted during operations and maintenance, combined with reduction in air pollutants as a result of newer and cleaner equipment, the Proposed Project would result in a net benefit to air quality. Therefore, operation and maintenance impacts would be less than significant.

Construction Impacts

- **Level of Significance:** Less Than Significant with Mitigation Incorporated
- **Mitigation Measure AIR–1: Compliance with TCAPCDs GAAQI.** As prescribed in TCAPCDs GAAQI, Sections 6.2 and 6.3, the following measures shall be implemented during Proposed Project construction to reduce criteria pollutant emissions.
- **Fugitive PM_{10} Measures**
  - Land Clearing/Earth Moving:
    - Water shall be applied by means of truck(s), hoses and/or sprinklers as needed prior to any land clearing or earth movement to minimize dust emission.
    - Haul vehicles transporting soil into or out of the property shall be covered.
    - Water shall be applied to disturbed areas a minimum of 2 times per day or more as necessary.
    - On–site vehicles shall be limited to a speed that minimizes dust emissions on unpaved roads.
    - A publicly visible sign shall be posted with the telephone number and person to contact regarding dust complaints. This person shall ensure corrective action is taken within 24 hours. The telephone number of the District shall also be visible to ensure compliance with District Rule 4:1 and 4:24 (Nuisance and Fugitive Dust Emissions).
  - **Visibly Dry Disturbed Soil Surface Areas:**

        - All visibly dry disturbed soil surface areas of operation shall be treated with a dust palliative agent and/or watered to minimize dust emission.
    - **Paved Road Track–Out:**
        - Existing roads and streets adjacent to the project will be cleaned at least once per day unless conditions warrant a greater frequency.
    - **Visibly Dry Disturbed Unpaved Roads:**
        - All visibly dry disturbed unpaved roads surface areas of operation shall be watered to minimize dust emission.
        - Unpaved roads may be graveled to reduce dust emissions.
        - Water shall be applied to disturbed areas a minimum of 2 times per day or more as necessary.
        - On–site vehicles shall be limited to a speed that minimizes dust emissions on unpaved roads.
        - Haul roads shall be sprayed down at the end of the work shift to form a thin crust. This application of water shall be in addition to the minimum rate of application.
    - **Vehicles Entering/Exiting Construction Area:**
        - Vehicles entering or exiting construction area shall travel at a speed that minimizes dust emissions.
    - **Employee Vehicles:**
        - Construction workers shall park in designated parking areas(s) to help reduce dust emissions.
    - **Soil Piles:**
        - Soil pile surfaces shall be moistened if dust is being emitted from the pile(s). Adequately secured tarps, plastic or other material may be required to further reduce dust emissions.
- **Measures for Construction Equipment**
    - Maintain all construction equipment in proper tune according to manufacturer's specifications.
    - Maximize, to the extent feasible, the use of diesel construction equipment meeting current CARB certification standards for off–road heavy–duty diesel engines.
    - Registration in CARB's DOORS program (www.arb.ca.gov) and meeting all applicable standards for replacement and/or retrofit.
    - All portable equipment, including generators and air compressors rated over 50 brake horse power, registered in the PERP (www.arb.ca.gov), or permitted through the District as a stationary source.
    - Electrify equipment where feasible.
    - Substitute gasoline–powered for diesel–powered equipment, where feasible.

- Use alternatively fueled construction equipment on site where feasible, such as compressed natural gas (CNG), liquefied natural gas (LNG), propane, or biodiesel.
- Use equipment that has Caterpillar pre–chamber diesel engines.

Significance After Mitigation

Implementation of Mitigation Measure AIR–1 would reduce construction–related air quality emissions impacts to less than significant.

Operation and Maintenance Impacts

- **Level of Significance:** Less Than Significant Impact
- **Mitigation Measures:** None required

4.5.4.3 Impacts Related to Sensitive Receptors

IMPACT 4.5–3: Would the project expose sensitive receptors to substantial pollutant concentrations?

Construction

Sensitive receptors are specific population groups who are most sensitive to the adverse health effects of air pollution, as well as the land uses where these groups would reside for long periods (i.e., residences and schools). The Proposed Project is located in a remote area of unincorporated Tehama County. The majority of the proposed facilities are sited away from sensitive receptors, with the exception of residences in the northwest portion of the Proposed Project area adjacent to the transmission line route.

Two residences are located approximately 100 feet from the transmission line route. One residence is along Rolling Hills Road adjacent to the transmission line and helicopter landing and take–off area (Multipurpose Area Number 4), and the second residence is on South Powerhouse Road adjacent to the transmission line. Other residences along South Powerhouse Road and Hazen Road are located approximately 200 feet from the transmission line route. The closest school, Manton Elementary, is approximately 0.6 mile north of the closest point of the transmission line. The town of Mineral is approximately 4 miles from the eastern part of the Proposed Project at the diversion dam site, but no sensitive receptors are in close proximity.

The Proposed Project would expose sensitive receptors to air pollutants during construction activities (pole installation and conductoring) along the northwest portion of the transmission line route. Due to the linear nature of the Project, construction activities would be spread across the 12– mile long transmission line route, lasting no more than a few days at each pole location. Additionally, there are trees and other vegetation, which would filter or block pollutants. With the short duration of construction near the residences, combined with the vegetative buffer, the Proposed Project would not expose sensitive receptors to long–term, substantial pollutant concentrations. Furthermore, Mitigation Measure AIR–1 would be implemented to control and minimize fugitive dust and fuel combustion emissions from construction equipment. Therefore, impacts would be less than significant with mitigation incorporated.

Operation and Maintenance

The Proposed Project's low operation and maintenance needs would result in an insignificant amount of air pollutant emissions that would be generated at the powerhouse, which is in a remote area not located near any sensitive receptors. Overall, with the annual average generation of 25,000 MWh of clean energy that could replace and offset generation from air pollutant emitting energy sources, the Proposed Project would improve air quality, which would benefit sensitive receptors. The impact would be considered less than significant.

Construction Impacts

- **Level of Significance:** Less Than Significant with Mitigation Incorporated
- **Mitigation Measures AIR–1:** Implementation of Mitigation Measure AIR–1 would reduce pollutants that could affect sensitive receptors to a less–than–significant level.

Significance After Mitigation

Implementation of Mitigation Measure AIR–1 would reduce construction–related air quality emissions impacts to less than significant.

Operation and Maintenance Impacts

- **Level of Significance:** Less Than Significant Impact
- **Mitigation Measures:** None required

4.5.4.4 Impacts Related to Substantial Emissions

IMPACT 4.5–4: Would the project result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?

Construction

The Proposed Project would use gasoline and diesel–powered equipment that would emit exhaust fumes during construction. Exhaust fumes, particularly diesel exhaust, can have a strong odor. However, as previously described, the Proposed Project is located in a remote area of Tehama County. Residences are located along the transmission line in the northwest portion of the Proposed Project area. Due to the linear nature of the Proposed Project, construction activities to install poles and conductor would last no more than a few days at each pole location. Trees and shrubs would act as a vegetative buffer. Since generation of construction diesel emissions would be brief and natural vegetative buffers would filter or block odors, the Proposed Project would not adversely affect a substantial number of people. Impacts would be less than significant.

Operation and Maintenance

The Proposed Project does not include the development of any facilities or operations and maintenance activities that would generate sizeable odors, nor does it include any new receptors located near existing odor sources. No impact would occur.

Construction Impacts

- **Level of Significance:** Less Than Significant Impact
- **Mitigation Measures:** None required

Operation and Maintenance Impacts

- **Level of Significance:** No Impact
- **Mitigation Measures:** None required

4.5.5 References

California Air Resources Board. 2016. Ambient Air Quality Standards. May 4, 2016. Available at: ww2.arb.ca.gov

California Air Resources Board. 2018. Maps of State and Federal Designations. October 2018. Available at: ww2.arb.ca.gov

California Air Resources Board. 2020. Guide to Off–Road Vehicle & Equipment Regulations. Available at: ww3.arb.ca.gov.

California Health and Safety Code section 39655a. Effective January 1, 1993. leginfo.legislature.ca.gov

Sacramento Valley Air Quality Engineering and Enforcement Professionals. 2018. Northern Sacramento Valley Planning Area 2018 Triennial Air Quality Attainment Plan.

Tehama County Air Pollution Control District. April 2015. Air Quality Planning and Permitting Handbook, Guidelines for Assessing Air Quality Impacts.

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4.6 Biological Resources – Aquatics and Fisheries

This section identifies describes the environmental setting and regulatory setting, describes the analysis methodology, and analyzes potential direct and indirect impacts from the construction, operation, and maintenance of the Proposed Project on aquatic and fisheries resources, including special–status aquatic species, fish, amphibians, aquatic reptiles, aquatic invertebrates, and their habitats. In addition, this section discusses the potential for the Proposed Project to conflict with policies designed to protect biological resources as defined in conservations plans, county policies, or in state/federal agency regulations or associated documents pertinent to the Proposed Project area.

Section 4.7, Biological Resources – Terrestrial for analysis of terrestrial resources including vegetative communities and wetlands, wildlife habitats, and special–status plants and wildlife.

4.6.1 Sources of Information – Aquatic Resources

Information for this section was derived from the Lassen Lodge Hydroelectric Project Final License Application and associated technical studies (Rugraw and Tetra Tech 2015a,b,c); FERC's Final Environmental Impact Statement (FEIS) analyzing the effects of issuance of the license (FERC 2018); the extensive consultation record developed during the licensing proceedings; and other sources, cited as appropriate.

4.6.2 Environmental Setting – Aquatic Resources

The environmental setting for aquatic resources is described below with respect to physical environment (fish passage barriers, hydrology, water quality and temperature, aquatic habitat, and sediment transport) and biological environment (fish and aquatic species presence, abundance, distribution and status).

4.6.2.1 Physical Environment

The Proposed Project is located on a 2.4–mile section of South Fork Battle Creek, within the larger Battle Creek Watershed (Figure 4.6–1).

Fish Passage Barriers

The lower portions of North Fork and South Fork Battle creeks are potential habitat for ESA–listed anadromous salmonids, but have previously been developed for hydropower, creating upstream fish passage barriers. The Battle Creek Salmon and Steelhead Restoration Project (BCSSRP)[13] is restoring habitat and removing dams/barriers to anadromy downstream of natural fish barriers on South Fork Battle Creek (approximately 18.9 miles of habitat) and North

[13] The BCSSRP is a collaborative effort among the Department of the Interior, the U.S. Bureau of Reclamation (Reclamation), PG&E, various resource agencies, and the public focused on restoring salmon and steelhead habitat downstream of the proposed Lassen Lodge Hydroelectric Project on Battle Creek, an area considered one of the most important anadromous fish spawning streams in the Sacramento River Valley (Jones & Stokes, 2005). We note that the proposed completion date for removing fish passage barriers has varied among agencies. In more recent letters of comment on the draft EIS, NMFS states that the completion date would be "approximately 2021"

Fork Battle Creek (approximately 13.5 miles of potential habitat) (Figure 4.6–1). The Proposed Project 2.4–mile bypass reach is either upstream of potential anadromy on South Fork Battle Creek or partially within the anadromous reach depending on whether or not anadromous fish can pass two natural barriers. Angel Falls (river mile [RM][14] 22.3) is a natural absolute fish barrier that blocks access to the upper 0.7 mile of the Proposed Project bypass. The lower 1.7 miles of the Proposed Project bypass reach is upstream of at least two other natural fish barriers, Panther Grade (RM 18.9) and Powerhouse Falls (RM 20.6). These two natural barriers have a high probability of being complete barriers to anadromous fish in South Fork Battle Creek (Cramer et al. 2015) (Figure 4.6–2) despite future removal of the manmade barriers that are farther downstream (Coleman Dam, Inskip Dam, and South Dam) by BCSSRP (Figure 4.6–1).

Within the portion of the Proposed Project bypass reach from the powerhouse tailrace (just above Powerhouse Falls) to Angel Falls, Cramer et al. (2015) revisited channel units from Sellheim and Cramer (2013) and identified the significant potential fish passage barriers (Figure 4.6–3). In addition to Powerhouse Falls and Angel Falls, there are three potential significant passage barriers in the bypass reach. These three potential barriers between Powerhouse Falls and Angel Falls are approximately 1.0 to 1.3 miles upstream of Powerhouse Falls (0.4 to 0.7 mile below Angel Falls). The three barriers vary in size and complexity, but the upper barrier at Unit 38 (see Figure 4.6–3) was identified as a “formidable barrier” (Cramer et al. 2015) with a combination falls height of 6.6 feet and 5.6 feet. Due to the boulder nature of the channel, cascades and large boulder areas could also present difficult fish passage at very low flows. Rugraw’s biologists have suggested a flow of approximately 30 cubic feet per second (cfs) or more would facilitate fish passage for adult anadromous fish in the bypass reach upstream of Powerhouse Falls.

[14] River Mile is measured upstream from confluence of Sacramento River.

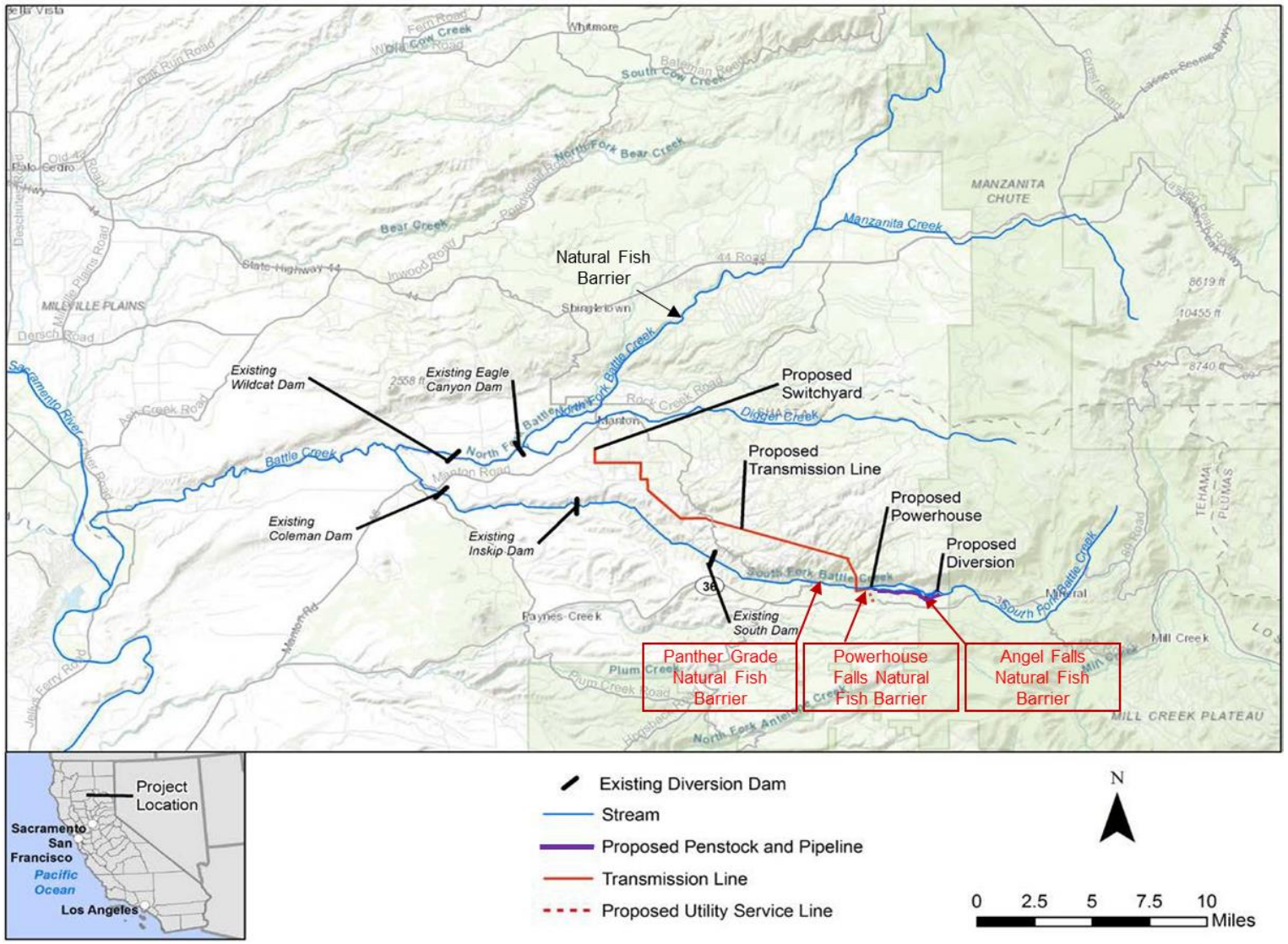

Figure 4.6–1. Overview Map of Upper South Fork Battle Creek Including Proposed Project Diversion, Powerhouse and Transmission Line/Switchyard, Upstream Natural Fish Barriers, and Other Existing Hydropower Dams in the Larger Battle Creek Watershed

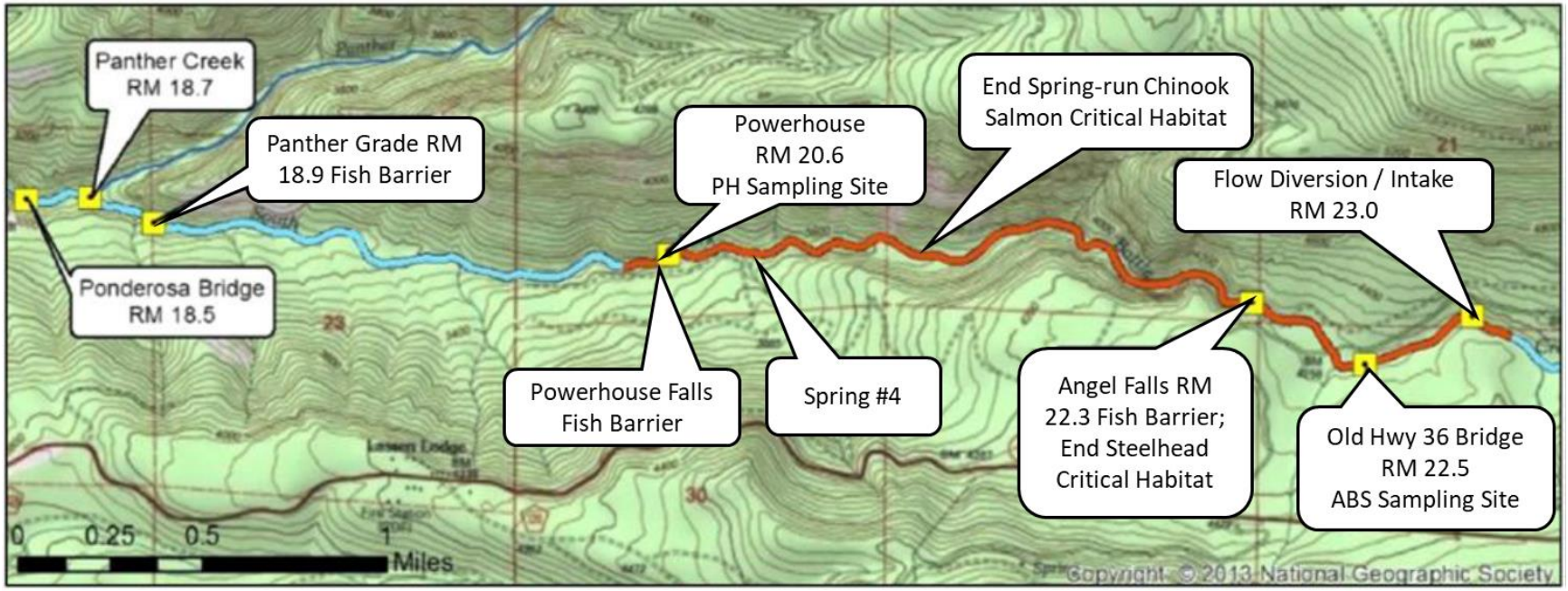

Figure 4.6–2. Area Map Showing the Proposed Project Diversion and Powerhouse, including River Miles (RM); Upstream Natural Fish Barriers; Critical Fish Habitat Upstream End Points; and Sampling Locations

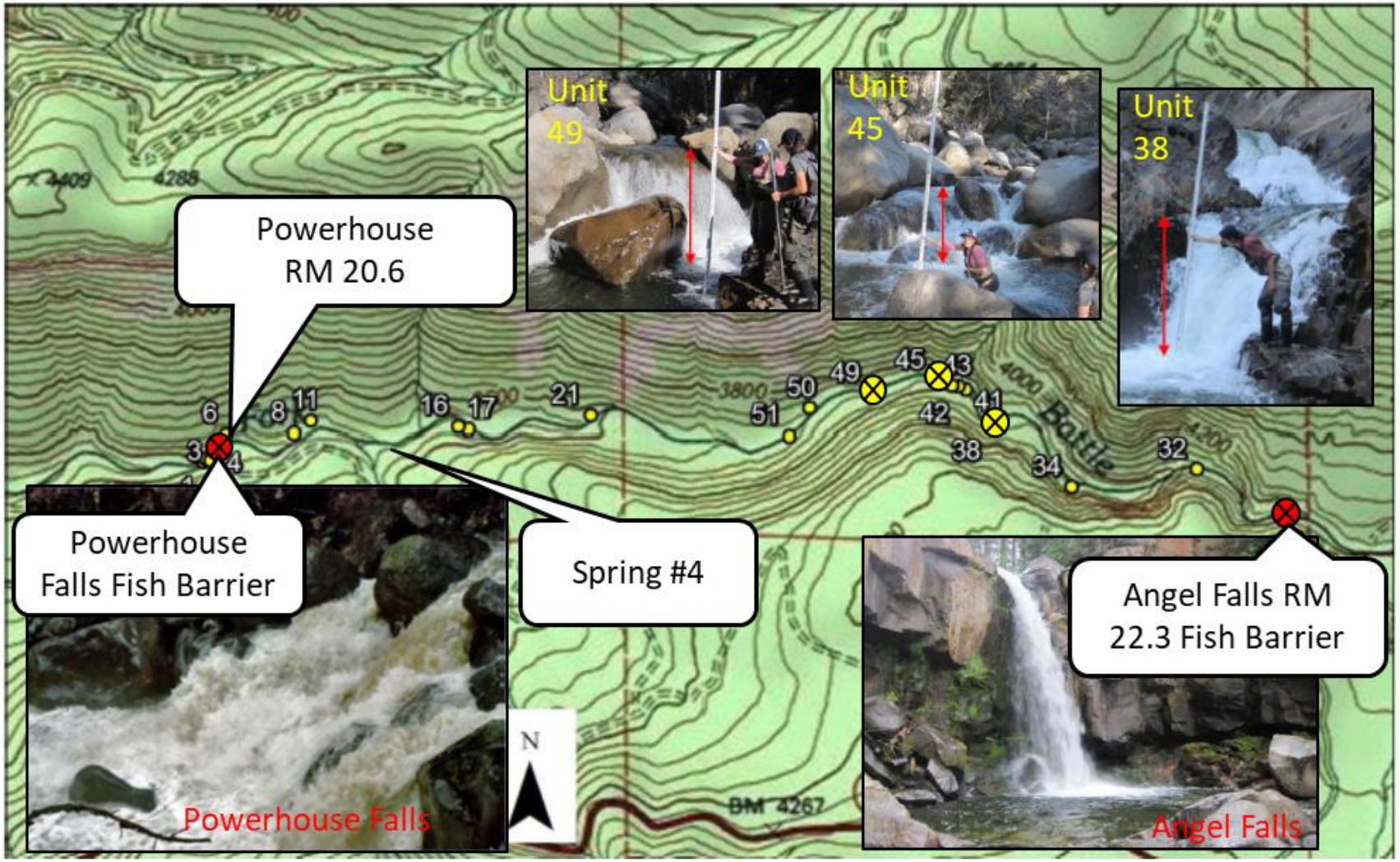

Figure 4.6–3. Map of Significant Fish Passage Barriers (Red), Channel Units Sampled in 2015 (Yellow) (Channel Unit Numbers from Sellheim and Cramer 2013) (Modified from Cramer et al. 2015)

Hydrology

The United States Geological Survey (USGS) stream gage (1959 to 1967) on South Fork Battle Creek near Mineral, CA (upstream of the Old Highway 36 Bridge at RM 22.5) was supplemented by long–term streamflow data from the USGS Deer Creek near Vina and Mill Creek near Los Molinos gages to develop an extended synthetic flow record (1929–2014) specific to the Proposed Project site. Table 4.6–1 and Table 4.6–2 show a summary of USGS gage information used to develop the synthetic streamflow record for the project area and monthly average flow data for South Fork Battle Creek near the Proposed Project diversion. In addition, Rugraw collected data at the Above Old Highway 36 Bridge Station (ABS) from 2015 to 2019. Figure 4.6–4 and Figure 4.6–5 show time series plots of the average daily flow data and exceedance plots by month, respectively. Figure 4.6–6 shows data collected November 1, 2014 by Rugraw that illustrates the length of stream naturally dry during the baseflow period of low flow years (the reach was also dry in 2015).

As the Proposed Project watershed is located at relatively high elevation, 3,400 to 9,000 feet, much of the precipitation that falls during the winter occurs as snow. As such, the hydrology of South Fork Battle Creek in the Proposed Project Area is driven by snowmelt, with the highest flows occurring from March through June. Average annual flow in the Proposed Project Area is approximately 60 cfs and average monthly flows range from a low of approximately 9 cfs in September to a high of 122 cfs in May (Table 4.6–1 and Table 4.6–2). During the short time the USGS gage near Mineral, CA was operated, maximum flow was 1,210 cfs and the minimum was 3 cfs. Due to a lack of springs upstream of or within the Proposed Project bypass reach, extreme low flows naturally occur in the late summer and fall (Figure 4.6–4, Figure 4.6–5, Figure 4.6–6). Based on the longer synthetic record (i.e., correlation with the Mill Creek near Los Molinos gage; Rugraw 2014), a 7–day average low flow of zero occurs with a frequency of once every 10 years, and a 7–day average low flow of 4.4 cfs occurs with a frequency of once every 2 years.

During drought years, such as 2014 and 2015, much of the Proposed Project bypass reach can be naturally dry in the fall (Figure 4.6–6). One spring, Spring Number 4 (RM 20.84), located 0.24 mile upstream of the proposed powerhouse, measured at 0.3 cfs in October 2014, and was the only detectable source of year–round surface inflow in the Proposed Project bypass reach (Cramer et al., 2015). Conversely, downstream of the Proposed Project, South Fork Battle Creek exhibits high base flow throughout the summer and fall with water entering the creek from numerous cold springs that emanate from volcanic rock downstream of Panther Grade at RM 18.9 (Figure 4.6–6).

Table 4.6–1. Streamflow Information for Gages Used to Develop the Synthetic Flow Record for South Fork Battle Creek

Gage Name	South Fork Battle Creek near Mineral	Mill Creek near Los Molinos	Deer Creek near Vina
Gage number	11376400	11381500	11383500
Mean basin elevation (feet–msl)	5,702	3,961	4,199
Drainage area (square miles)	33.2	131.4	208.7
Dates of operation	1960–1967	October 1, 1928 to June 20, 2017	October 1, 1911, to September 29, 1915; April 1, 1920 to June 20, 2017
Mean flow (cfs)	60	304	322
Maximum flow (cfs)	608	14,400	20,100
Minimum flow (cfs)	4	52	52

Source: USGS, 2017a,b

Table 4.6–2. Minimum, Maximum, and Mean Monthly Flow Values for South Fork Battle Creek at the Project Site

Month	Minimum Flow[a] (cfs)	Mean Flow[b] (cfs)	Maximum Flow[a] (cfs)
Jan	8	69	561
Feb	15	80	986
Mar	14	86	435
Apr	42	117	577
May	41	122	534
Jun	14	81	387
Jul	7	28	214
Aug	4	12	62
Sep	4	9	29
Oct	3	13	983
Nov	6	27	290
Dec	6	57	1,210

Source: Rugraw, 2014, as modified by FERC staff

a Observed streamflow values from USGS South Fork Battle Creek near Mineral gage (1959 to 1967).

b Mean flow values were derived from a synthetic flow record using Mill Creek near Los Molinos flow values (1928 to 2017).

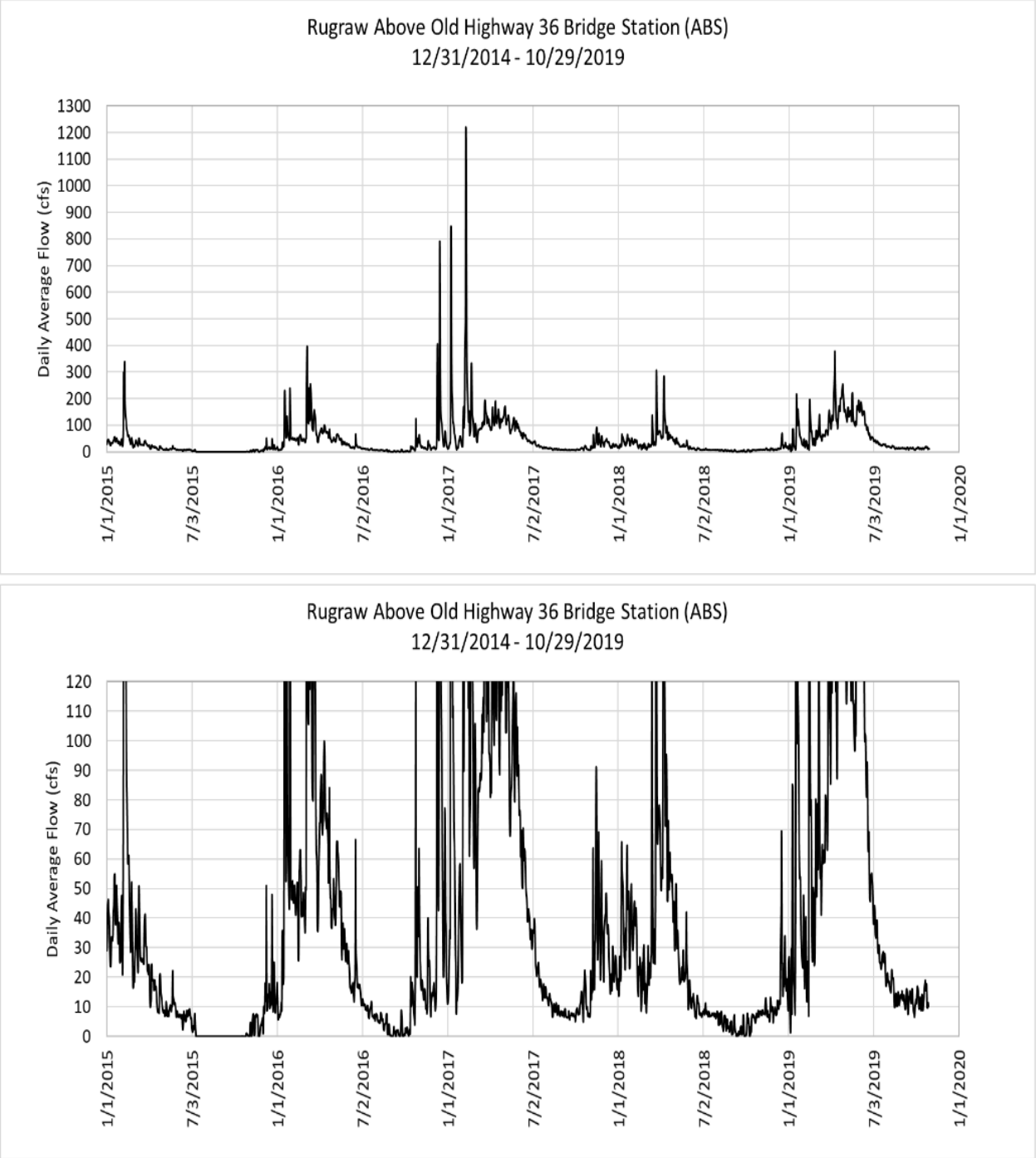

Figure 4.6–4. Time Series Hydrology for the South Fork Battle Creek Based on Rugraw Above Old Highway 36 Bridge Station Based on Empirical Data (ABS; 2015 – 2019) Data Set (note scale change in lower graph)

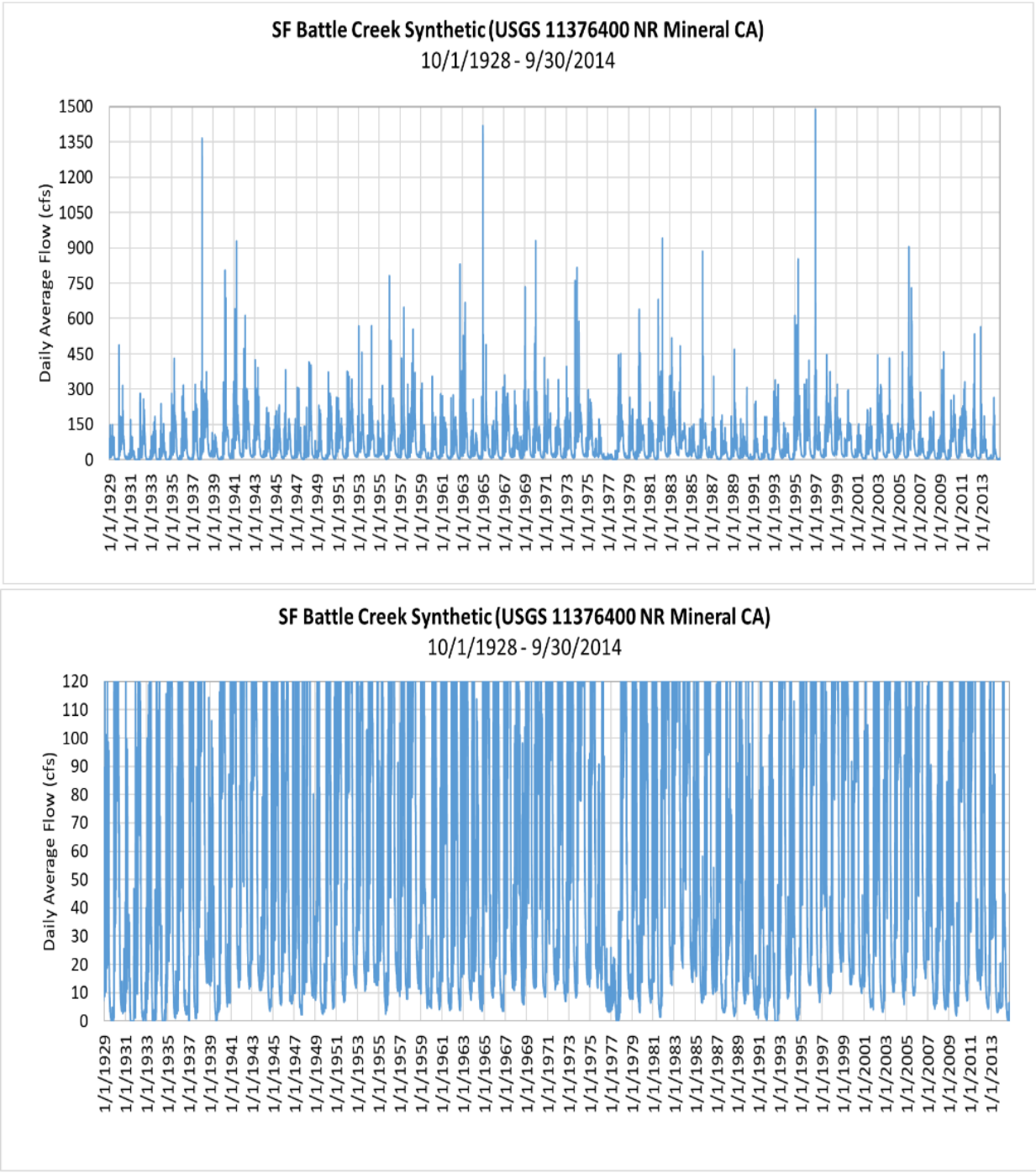

Figure 4.6–4. (continued) Time Series Hydrology for the South Fork Battle Creek Based on Synthetic Data (USGS 11376400 NR Mineral CA; 1929 – 2014) (note scale change in lower graph)

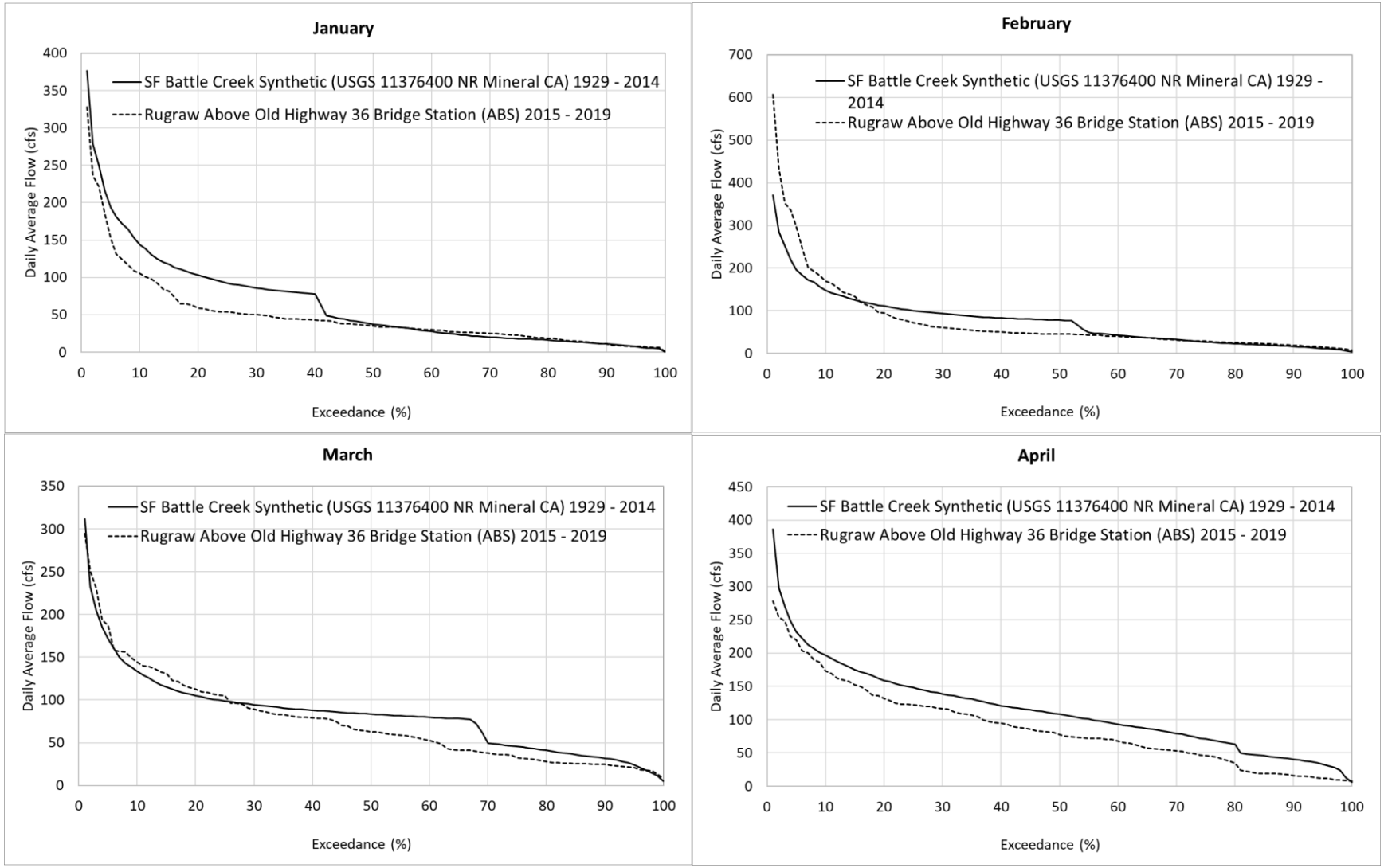

Figure 4.6–5. Exceedance Hydrology (January–April) for the South Fork Battle Creek Synthetic Data (USGS 11376400 NR Mineral CA; 1929 – 2014) and Rugraw Above Old Highway 36 Bridge Station Empirical Data (ABS; 2015 – 2019)

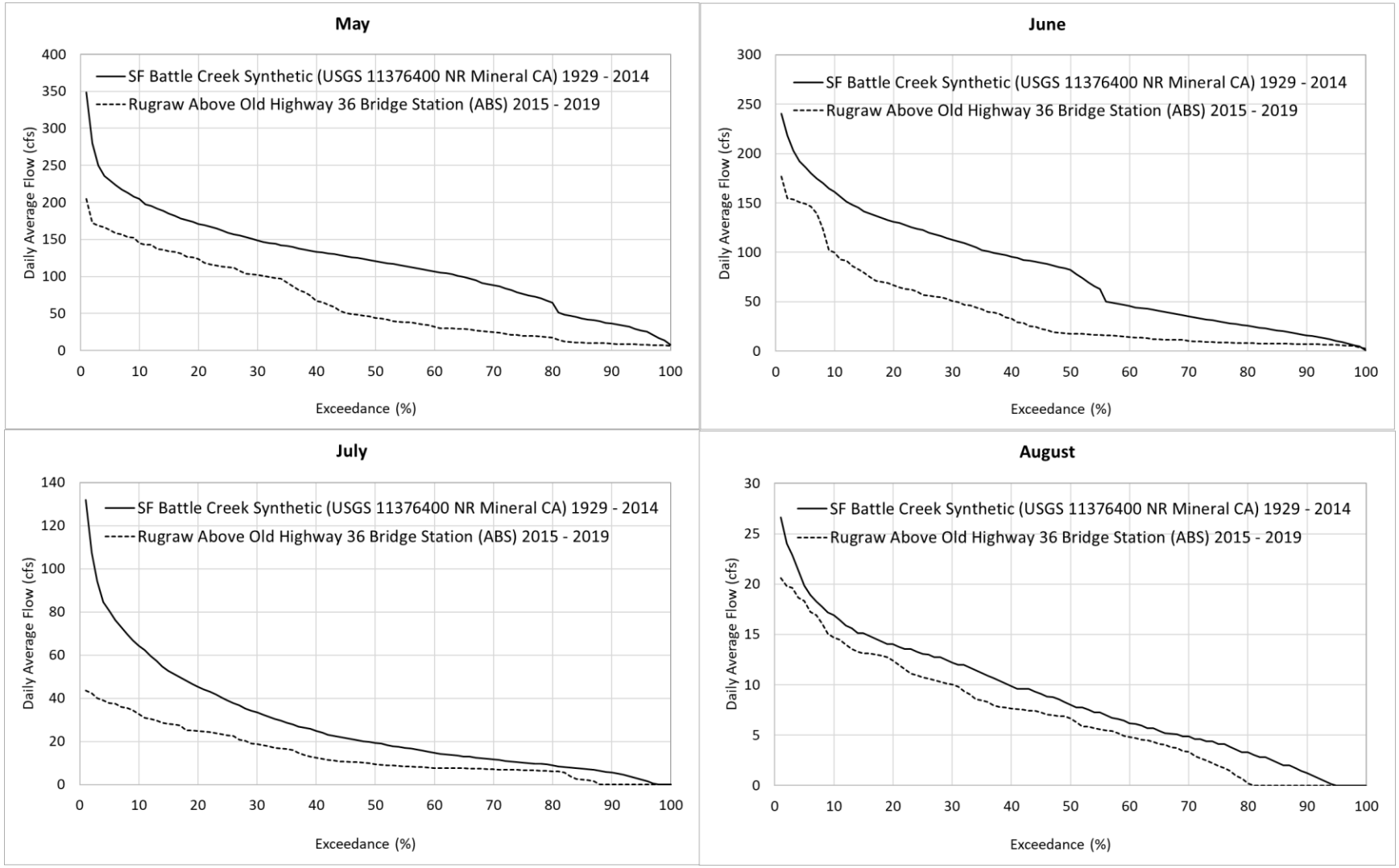

Figure 4.6–5. (continued) Exceedance Hydrology (May–August) for the South Fork Battle Creek Synthetic Data (USGS 11376400 NR Mineral CA; 1929 – 2014) and Rugraw Above Old Highway 36 Bridge Station Empirical Data (ABS; 2015 – 2019)

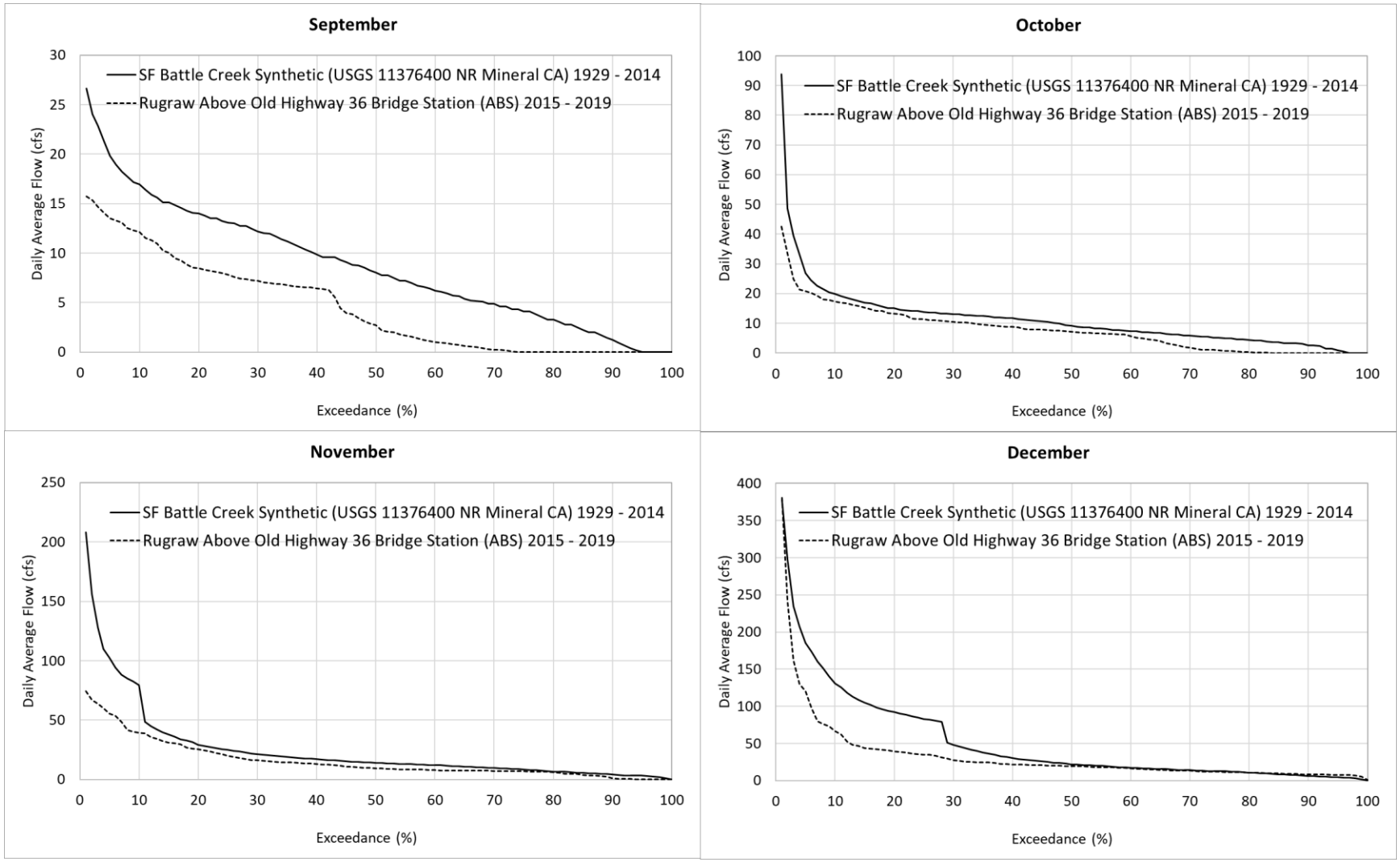

Figure 4.6–5. (continued) Exceedance Hydrology (September–December) for the South Fork Battle Creek Synthetic Data (USGS 11376400 NR Mineral CA; 1929 – 2014) and Rugraw Above Old Highway 36 Bridge Station Empirical Data (ABS; 2015 – 2019).

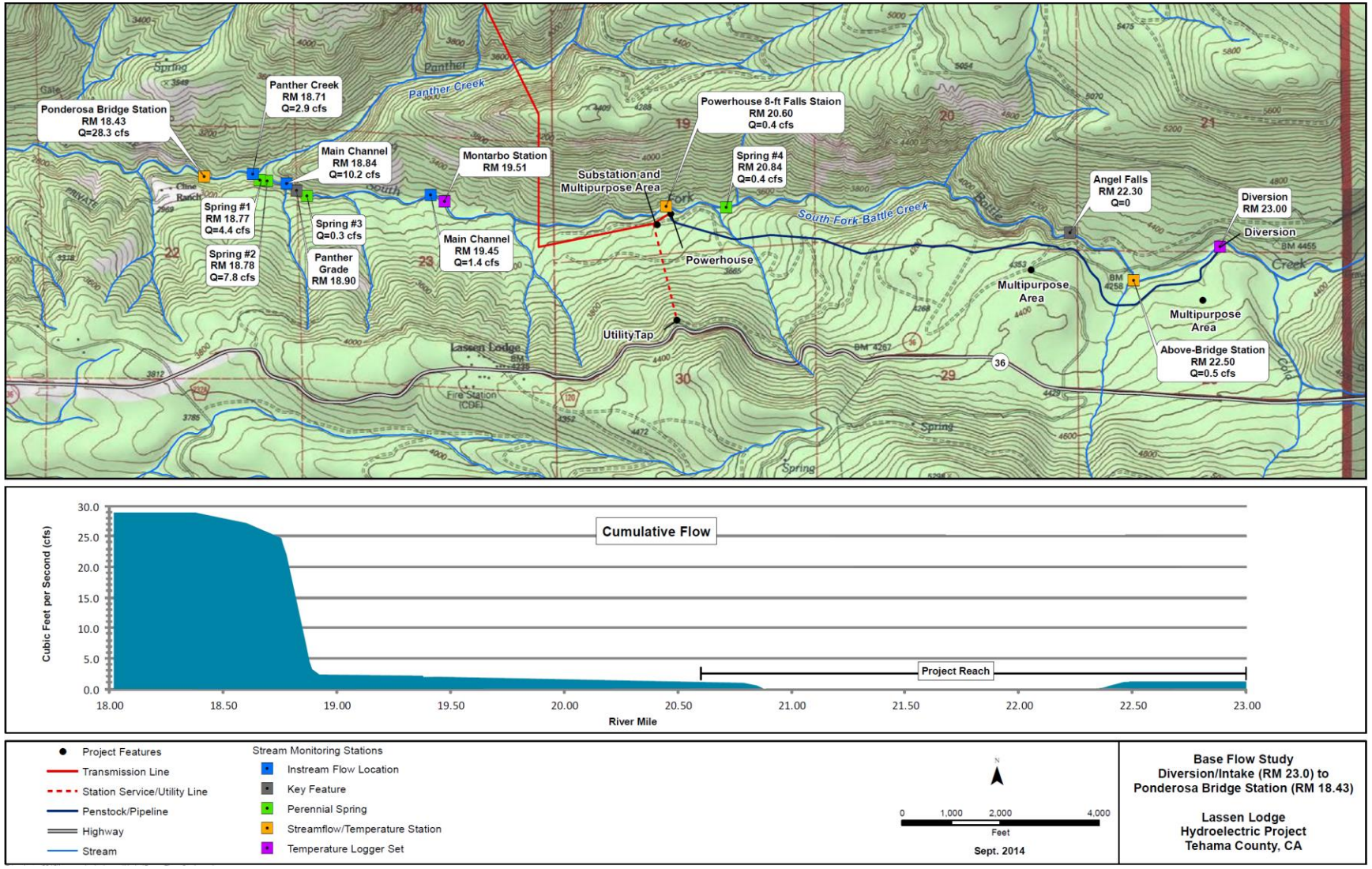

Figure 4.6–6. Baseflow Study November 1, 2014 (Source: Parkinson and Rugraw 2014).

Water Quality and Temperature

Water Quality

Water quality sampling near the proposed diversion dam site and proposed powerhouse site conducted on September 4, 2013, during the critical low–flow period (streamflow of 4 to 5 cfs at the proposed diversion dam site) showed that the creek had low alkalinity, neutral pH, and low electrical conductivity (Table 4.6–3). Analyses for heavy metals at both sites did not reveal the presence of the 18 regulated drinking water metals (Tetra Tech, 2015a). Dissolved oxygen was 7.7 mg/l and 6.3 mg/l, which was 90 percent and 66 percent of saturation at the proposed diversion and proposed powerhouse site, respectively. The cause for the lower daytime dissolved oxygen saturation at the powerhouse site was not identified. Typically, small mountain streams are well oxygenated irrespective of flow rate. Some plausible explanations include groundwater inflows that are not well oxygenated, some other type of unknown oxygen demand issue, or dissolved oxygen probe issues (notoriously difficult to keep calibrated). At a flow of 13 cfs, on July 3 and 4, 2013, dissolved oxygen measurements conducted while habitat mapping between Angel Falls and the proposed powerhouse location were 7.6 to 8.9 mg/L, or 86 to 89 percent of saturation (Sellheim and Cramer, 2013).

Based on the low flow sampling, natural water quality is generally good for aquatic species (e.g., fish, amphibians). Cold water fish typically need dissolved oxygen concentrations equal to or greater than 7 mg/l (CVRWQCB 2018), which was present in the stream except for one measurement at the proposed powerhouse site.

Table 4.6–3. South Fork Battle Creek Surface Water Quality, September 4, 2013[a]

Parameter	Proposed Diversion Dam Site (RM 23.0)	Proposed Powerhouse Site (RM 20.6)
Field temperature (°C)	16.73	11.61
Field dissolved oxygen (mg/L)	7.66	6.27
Conductivity, field/lab (µmhos/cm)	69/79	63/82
pH, field/lab (standard units)	7.42/7.51	7.95/7.57
Turbidity[b]	0	0
Hardness as $CaCO_3$[b]	26	26
Total alkalinity (mg/L)	32	39
Bicarbonate as $CaCO_3$ (mg/L)	32	39
Carbonate as $CaCO_3$ (mg/L)	<5	<5
Total dissolved solids (mg/L)	62	64
Hydroxide (mg/L)	<5	<5
Chloride (mg/L)	0.56	0.89
Fluoride (mg/L)	<0.10	<0.10
Nitrate as NO_3[b]	<2.0	<2.0
Sulfate as SO_4[b]	5.1	2.3
Calcium (mg/L)	6.4	5.8
Magnesium (mg/L)	2.5	2.8
Potassium (mg/L)	1.3	1.3
Sodium (mg/L)	3.2	2.4

Source: Tetra Tech, 2015a

Notes: mg/L = milligrams per liter
µmhos/cm = micromhos per centimeter

a Sampled at a flow of 4 to 5 cfs at the proposed dam location.

b Units not reported by Tetra Tech (2015a).

Water Temperature

Rugraw collected water temperature data in multiple years, 2003 to 2006 and 2013 to 2019, (partial data in some years) for Proposed Project planning purposes (Figure 4.6–7, Figure 4.6–8, and Figure 4.6–9). Data collected near the proposed diversion dam from November 2003 through December 2006 showed daily mean temperatures that ranged from near freezing in the winter to a maximum of about 18ºC in late summer (Tetra Tech, 2015a) (Figure 4.6–7, top plot).

Peak temperatures correlate with the seasonal low flow regime in the creek, particularly at the upstream sampling site. For example, in late summer of drought years (e.g., 2014 and 2015), the water temperature at the ABS site (see Figure 4.6–2 for sampling locations) were greater than 20°C and had large diel (daily) temperature fluctuations (typically greater than 5°C), while the downstream powerhouse site had cooler water temperature (15 to 16°C) and

a smaller diel temperature fluctuation (typically 2 to 3°C)(Figure 4.6–7 middle and bottom plot, Figure 4.6–8, and Figure 4.6–9 bottom plot).

During fall 2014, the middle of the Proposed Project bypass reach was dry due to natural low flows (Figure 4.6–6) and spring flow from Spring Number 4 just upstream of the proposed powerhouse restarted the flow and was the source of the cooler water at the powerhouse site. Springs farther downstream of the powerhouse greatly increased the flow (Figure 4.6–6) and decreased the water temperature (Figure 4.6–7, middle and bottom plot). Similar summer warm conditions at the ABS and cooler conditions at all temperature monitoring sites upstream of Spring Number 4 occurred in early summer of 2015 (another drought year) (Figure 4.6–8).

Water temperature data from 2015 through 2019 show that summer average daily water temperatures below 20°C occur in the higher flow years (2016, 2017 and 2019) (Figure 4.6–9, Figure 4.6–4) and occur when flows are above approximately 10 cfs (Figure 4.6–9, Figure 4.6–10). As discussed in Section 2.3.2, the Proposed Project would not begin operation until flows reach 18 cfs. Figure 4.6–9 also shows that in 2017 when there was more flow in the Proposed Project bypass reach during the late summer/early fall (approximately seven cfs or more, see Figure 4.6–4), the average daily water temperature at the ABS and powerhouse sites were nearly identical; however, as mentioned previously, the powerhouse site had less diel fluctuation. Figure 4.6–9 also shows that during the winter and spring the water temperature at the powerhouse site was slightly warmer than the ABS site.

Approximately two miles upstream of the proposed diversion dam site, the creek flows through a large, open meadow with minimal riparian shading, which can result in both summer warming and winter cooling of the water at the upstream ABS site. Within the Proposed Project area, the canyon is narrow and incised with less solar exposure, which can cool the stream in the summer and warm the stream in the winter. In addition, Spring Number 4 upstream of the proposed powerhouse provides groundwater inflow. Both factors can stabilize summer and winter water temperatures in the downstream portion of the Proposed Project bypass reach.

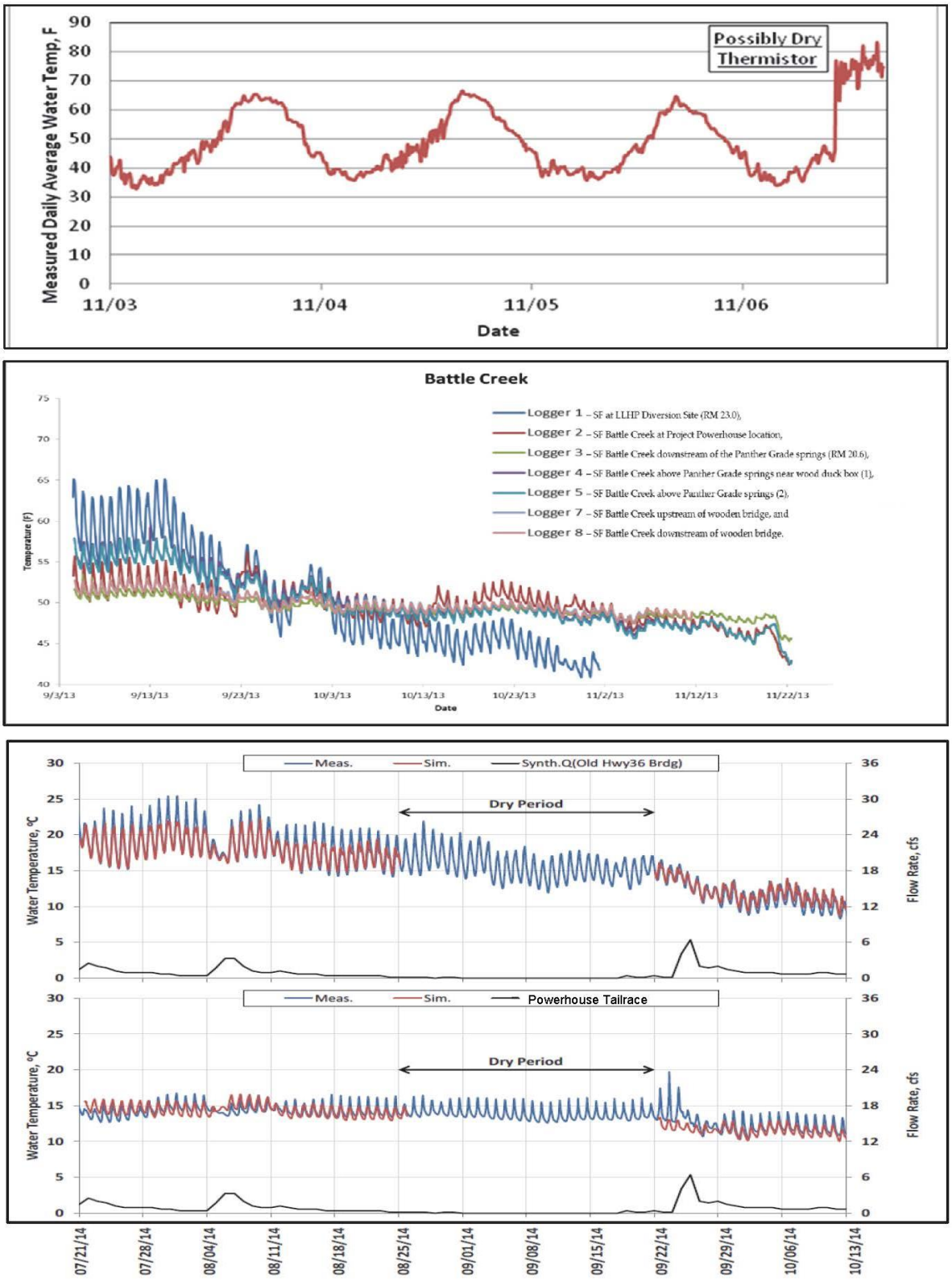

Figure 4.6–7. Historical Water Temperature Data Sets for the Project Area. Top – ABS Site 2003–2006, Middle – Various locations above and

below the Proposed Project 2013, and Bottom – ABS and Powerhouse Sites 2014

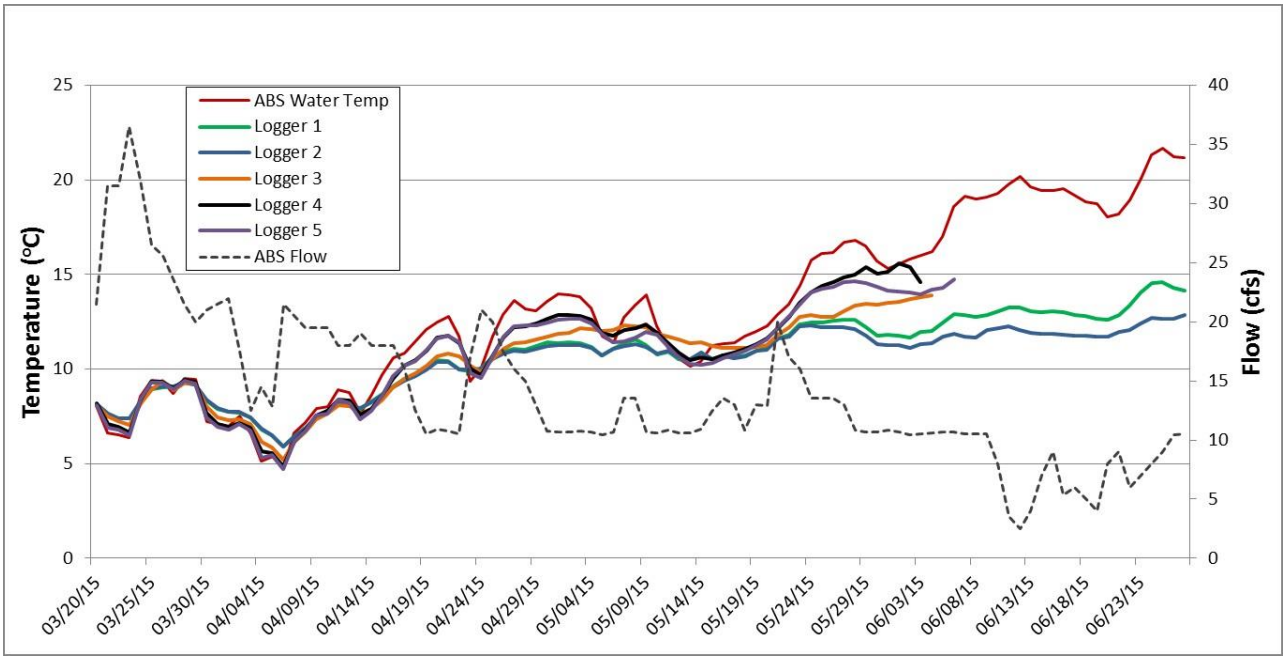

Figure 4.6–8. Daily mean temperature and streamflow in South Fork Battle Creek, March–June 2015 (ABS at RM 22.5, Number 5 at RM 21.7, Number 4 at RM 21.4, and Number 3 at RM 21.1, all of which were located upstream of Spring Number 4; and Number 2 at RM 20.6 and Number 1 at RM 20.4, both of which were located downstream of Spring Number 4) (Source: Cramer et al., 2015, as modified by staff)

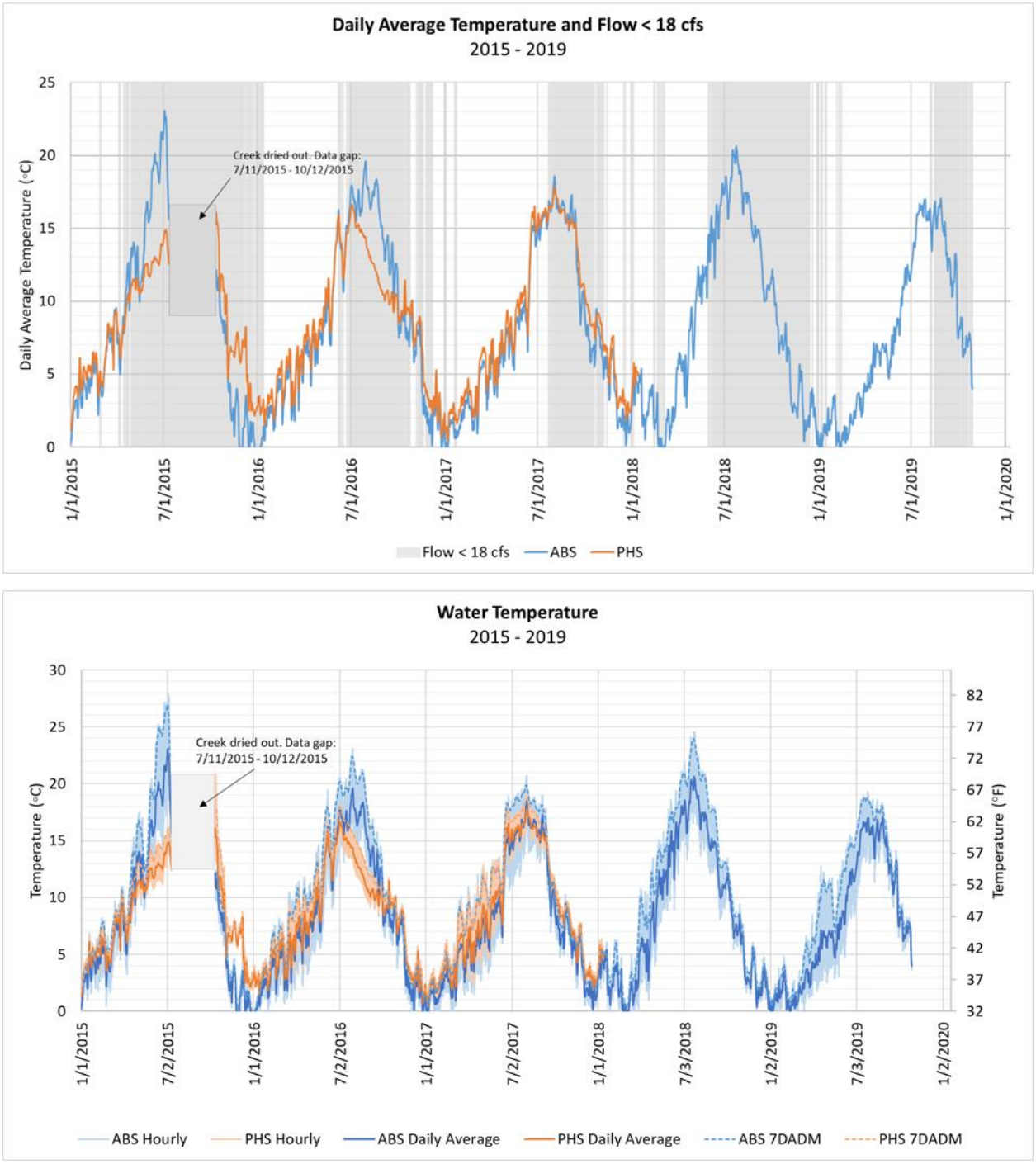

Figure 4.6–9. Water Temperature Data at the ABS and Powerhouse Sites (hourly, daily average, and 7–day average daily maximum) (Top) and Daily Average with Periods when Flow at ABS is Less Than 18 cfs are Shown in Gray (Bottom) (Source: Rugraw Data)

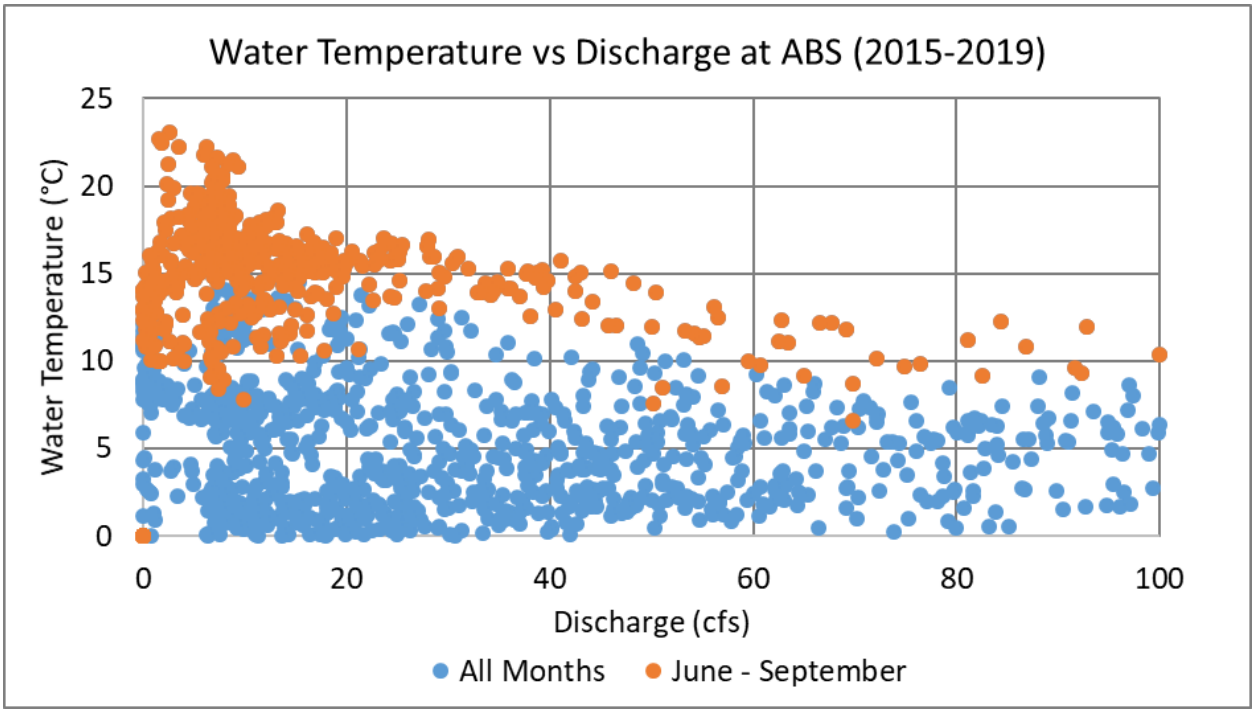

Figure 4.6–10. Daily Average Water Temperature at the ABS Site Versus Flow at the ABS Site

Aquatic Habitat

In July 2013, Rugraw completed a detailed aquatic habitat survey in the Proposed Project bypass reach from RM 20.6 to RM 22.3 (Sellheim and Cramer, 2013). At that time, the flow was 13 cfs. All 51 channel habitat units in the reach were classified into pools, riffles, rapids, or cascades and measured for gradient, wetted and active channel dimensions, substrate composition, depth, velocity, wood complexity, potential barriers, and channel constraint types (Table 4.6–4).

The Proposed Project bypass reach channel is confined by either bedrock or hill slopes throughout the majority of the Proposed Project area (Sellheim and Cramer 2013). The measured stream gradient is very steep and averages approximately five percent in most of the reach but increases to approximately 15 percent just downstream of Angel Falls. The mean active channel width is 85 feet, and the mean wetted channel width is 23 feet. Fast–water channel units comprise more than 80 percent of the surface area (Figure 4.6–11). Large boulders are the dominant substrate type in channel units in the Proposed Project reach, often creating “pocket water” habitat. Sixteen of the 20 pools in the reach were greater than one meter deep at 13 cfs and likely capable of supporting resident trout through the low flow season. Flows in the range of 30 to 60 cfs likely would provide adequate passage opportunities (i.e., connectivity) for trout to move about within the reach. Gravel and cobble are more common in pools than in other habitat unit types; however, these substrate size classes are relatively rare. The channel contains almost no woody debris.

Although the Proposed Project bypass reach contains suitable resident salmonid rearing and spawning habitat, low natural flows during the late summer/early fall limit the availability of resident salmonid rearing habitat, especially during dry years when flows decrease to less than

five cfs and/or are dry in much of the reach (Figure 4.6–6) and water temperatures climb above 20°C (Figure 4.6–9 and Figure 4.6–10).

Salmonid rearing habitat, measured over a range of flows at five habitat units (Cramer et al. 2015) (limited number of habitat units), show that the amount of rearing habitat versus flow reached a "maximum" and leveled out in the pools at a relatively low flow rate of 15 cfs to 25 cfs (Figure 4.6–12), but continued to increase to 40 cfs in the riffles. When the rearing habitat versus flow relationships were combined with flow for 2015, Figure 4.6–13**,** a summer (and similarly, fall), low flow rearing habitat "bottleneck" for resident fish is apparent. This indicates that the overall population of resident species would frequently be limited by annual low flow events (see Figure 4.6–4). If anadromous fish were able to access the Proposed Project area bypass reach (see Fish Barriers discussion above), then downstream movement of juvenile anadromous fish in the spring could augment rearing populations in the downstream reaches. As a result, the rearing habitat available in the spring/early summer in the bypass reach could have overall benefit to the population in the watershed despite limited summer/fall habitat.

United States Fish and Wildlife Service (USFWS) staff used data from six cross–sections from Rugraw/Cramer to create an "approximate" physical habitat versus flow simulation (PHABSIM) (Figure 4.6–14) for Chinook salmon and steelhead juveniles/fry. Typically, many more cross–sections are used in PHASIM studies. While the modeling approach/data were not reviewed, are not standard, and were based on 1995 habitat suitability criteria with no stakeholder review, the habitat versus flow relationships are relatively consistent with the Cramer et al. (2015) habitat versus flow relationships (above) and show that fry rearing habitat reaches a maximum at approximately 25 cfs and juvenile rearing habitat reaches a maximum at approximately 35 cfs.

Spawning gravels in the Proposed Project bypass reach are limited and readily mobilized by high flows (Cramer et al. 2015), which could result in scoured redds. With respect to potential anadromous spawning if anadromous fish were able to enter the bypass reach, Chinook salmon spawning capacity was estimated to be very low at 4 redds at 13 cfs, and 9 redds at 31 cfs (flows surveyed). This could produce an estimated 872 parr and 1,962 parr, respectively (Cramer et al. 2015). Figure 4.6–15 shows the approximate flow versus spawning habitat (redds) up to approximately 40 cfs, assuming the change in habitat versus flow is relatively linear. However, median (50 percent exceedance) flows during the September–October time period when Chinook spawning occurs are approximately 8 to 9 cfs and less than the 13 cfs flow that was surveyed (Figure 4.6–5). Low summer/fall flows would substantially limit rearing potential of stream–type[15] spring–run Chinook salmon juveniles that remain in the stream through summer/fall (see above). Potential steelhead trout spawning capacity was higher with potentially 50 redds at 13 cfs and 116 redds at 31 cfs (Figure 4.6–15) and could produce roughly 13 times more parr (18,908 parr) than the low–flow rearing capacity (1,407 parr) modeled by Cramer and Ceder (2013). Similar to stream–type spring–run Chinook salmon juveniles, low summer/fall flows would be a bottleneck for steelhead trout; however, downstream movement below the bypass reach could have an overall benefit to the population in the watershed despite limited summer/fall habitat.

[15] Stream–type Chinook salmon juveniles remain in the stream for an extended period of time compared to ocean–type juveniles, which migrate downstream to the ocean in their first three months.

Table 4.6–4. Habitat Mapping in South Fork Battle Creek from Proposed Powerhouse Site to Angel Falls, Taken July 3 and 4, 2013, at a Flow of 13 cfs

Unit Type	Unit Information Square Feet	Unit Information % Total Area	Unit Information Number of Units	Wetted Average Channel Width (feet)	Active Average Channel Width (feet)	Gradient Substrate %	Fines Substrate %	Gravel Substrate %	Cobble Substrate %	Boulder Substrate %	Bedrock Substrate %
Cascade	5,886	2.4	3	13.8	67.9	20.9	0	0.6	4.4	95	0
Pool	34,195	14.8	20	29.5	75.4	0	2.4	20.3	20.9	43.1	11.9
Rapid	64,252	26.3	11	24.9	61.7	14.2	0.5	2.2	3.2	91.4	2.7
Riffle	138,031	56.5	17	21.6	92.5	5.3	2	5.7	7.8	74.4	10.8

Source: Sellheim and Cramer, 2013

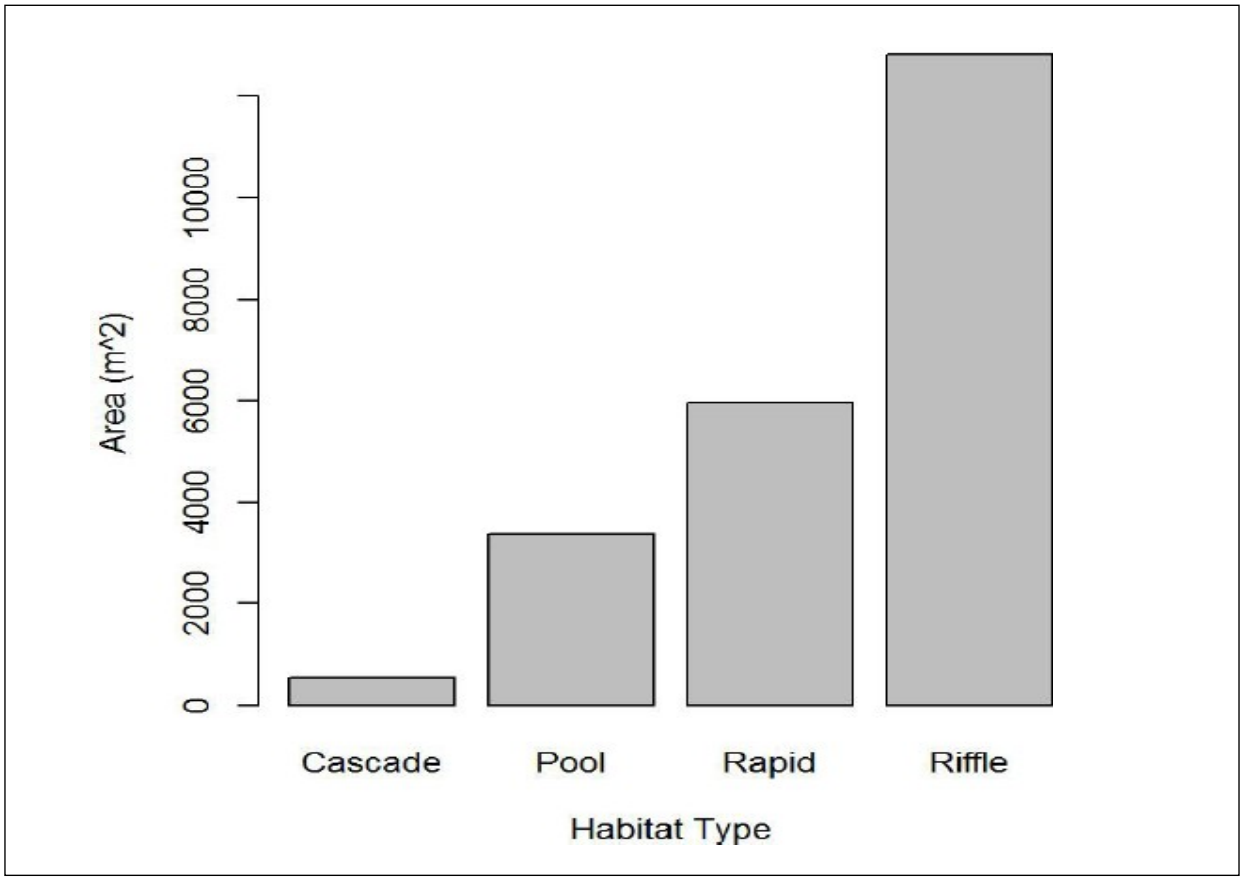

Figure 4.6–11. Areas of each channel unit type within the survey reach of South Fork Battle Creek (Source: Sellheim and Cramer, 2013).

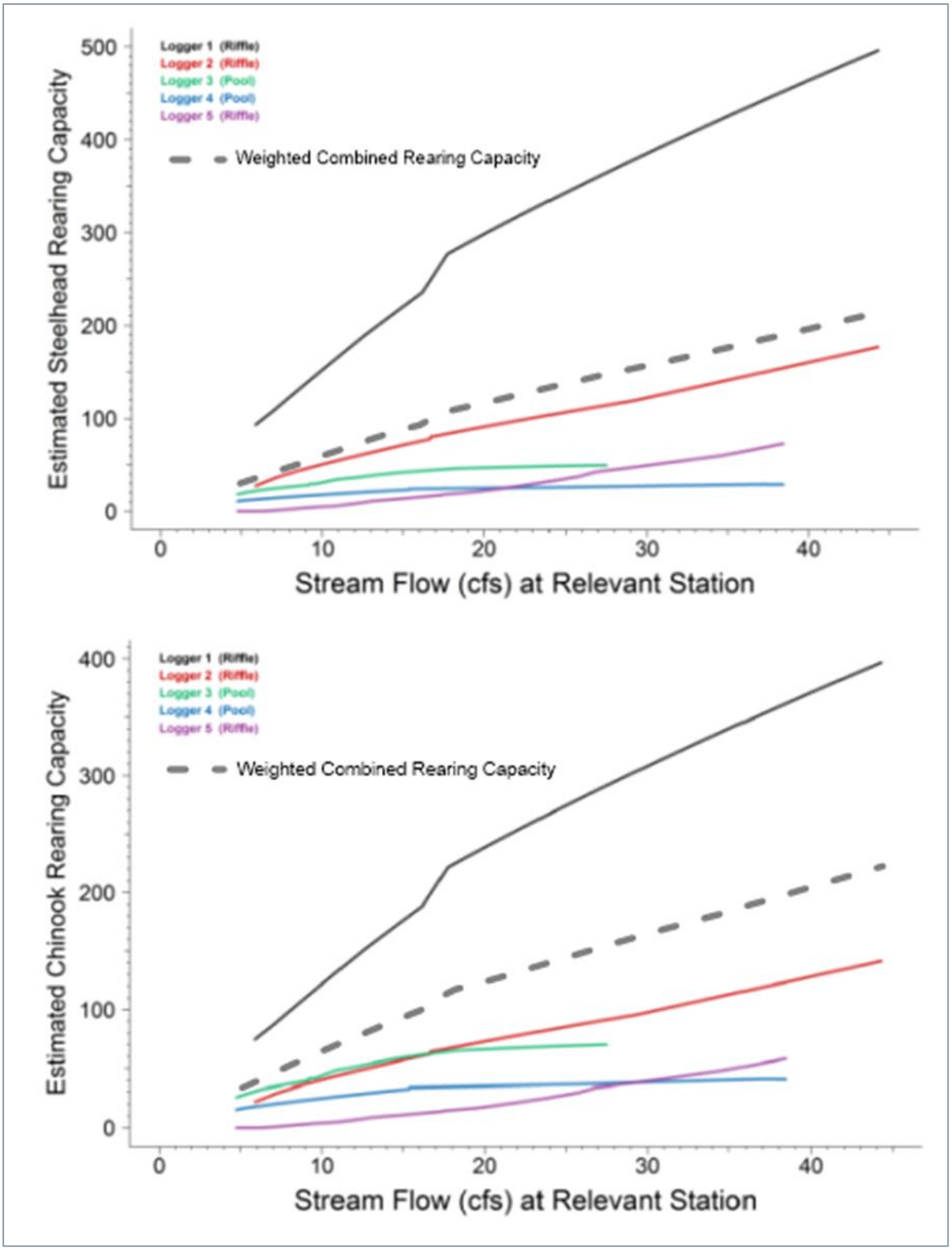

Figure 4.6–12. Predicted Rearing Capacity for Steelhead or Resident Rainbow (Upper Graph) and Chinook (Lower Graph) Across a Range of Flows and Dimensions Actually Measured in Specific Channel

Unit Where Pressure Transducers Were Placed (Source: Cramer et al. 2015)

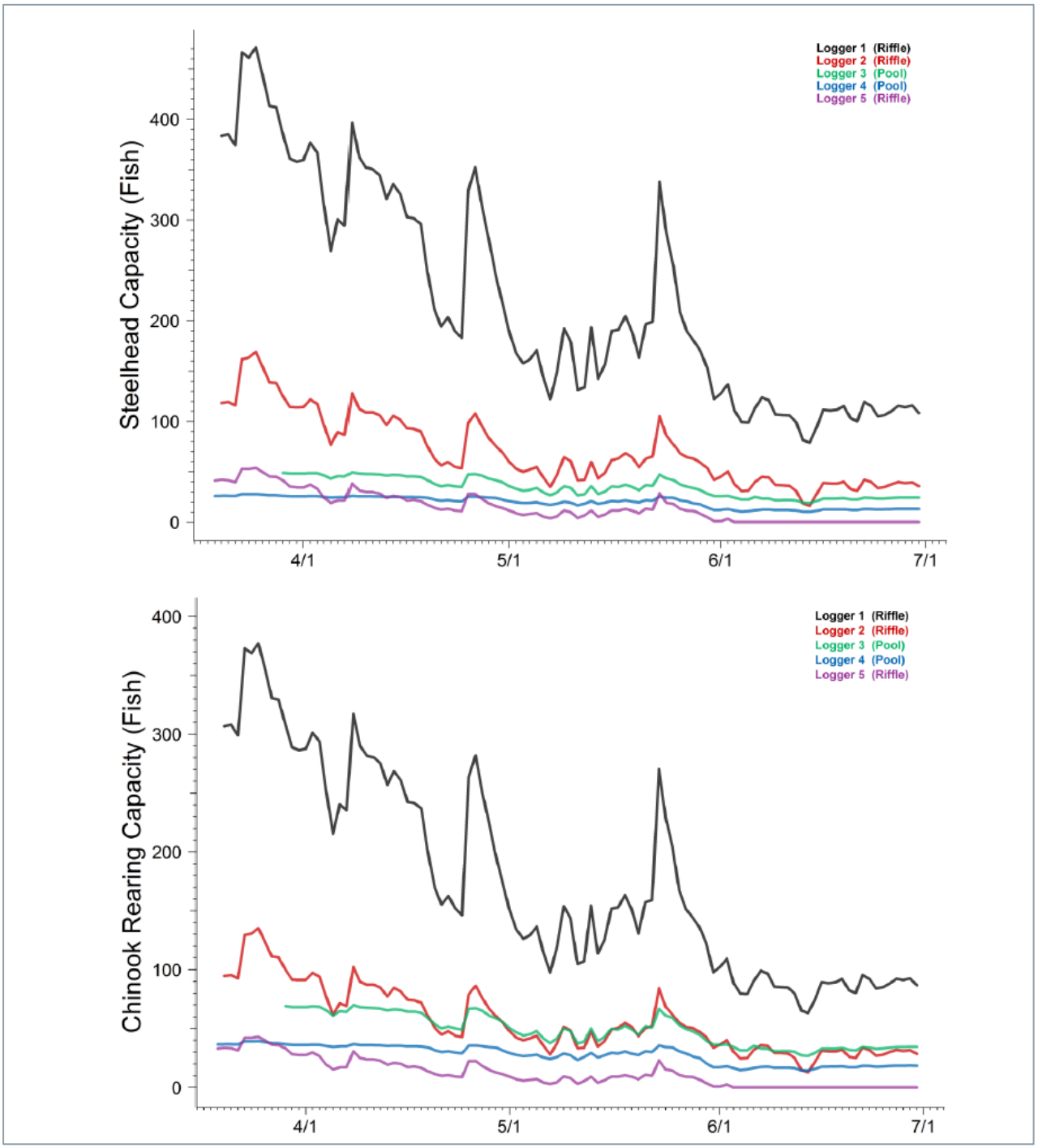

Figure 4.6–13. Reduction in estimated rearing capacity for juvenile steelhead or resident rainbow (upper graph) and chinook (lower graph) across the 2015 monitoring season as flows dropped from late March

through June. Capacities are the same as those represented in Figure 4.6–12 (Source: Cramer et al., 2015)

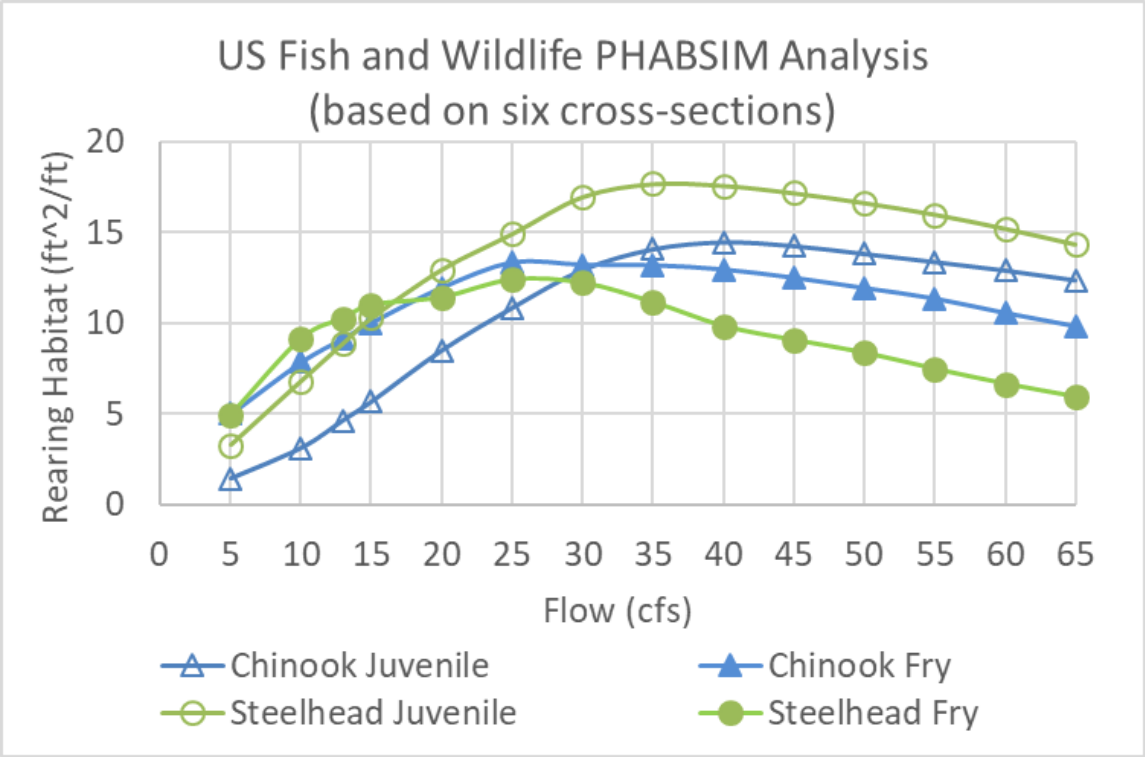

Figure 4.6–14. US Fish and Wildlife Physical Habitat Simulation (PHABSIM) Using Data from Six Cross–Sections Provided by Rugraw/Cramer.

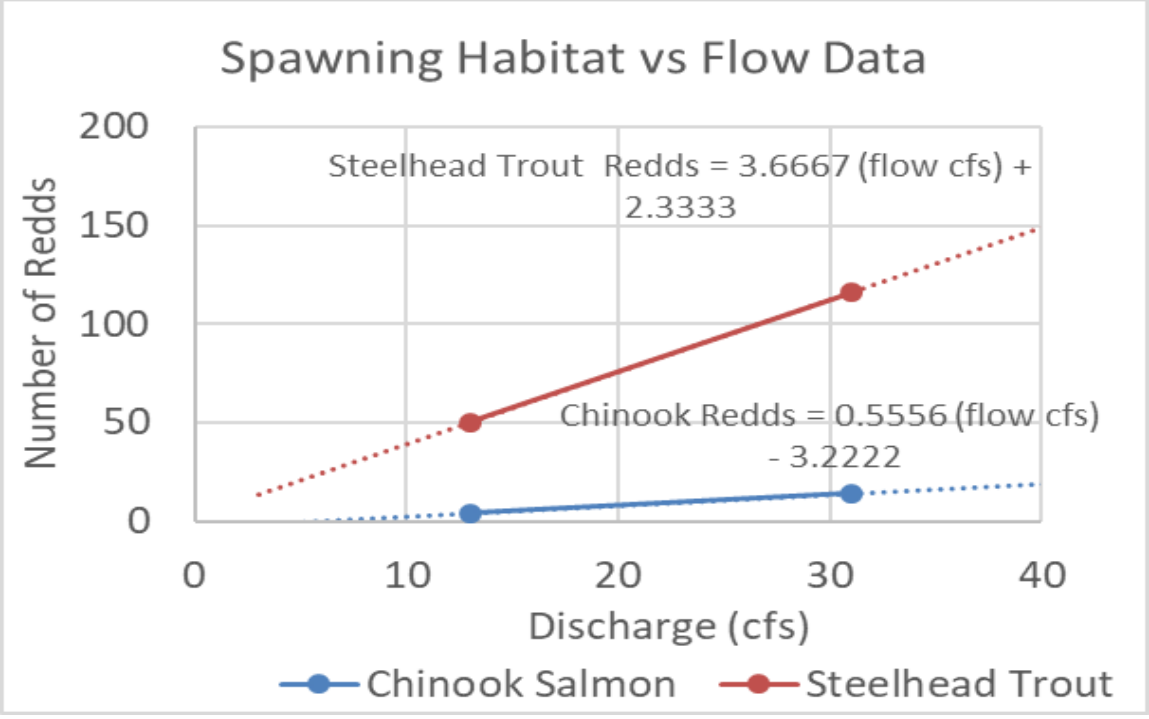

Figure 4.6–15. Spawning Habitat (Redds) Versus Flow in the Proposed Project Bypass Reach (Cramer et al., 2015) (note extrapolation lines, dotted, are linear)

Sediment and Large Woody Debris Transport

The existing stream channel in the Proposed Project bypass reach is primarily bedrock with the floodplain constrained by canyon walls. There is a near absence of woody debris (all pools are formed by boulder dams) (Cramer et al. 2015). The channel near the Proposed Project diversion is moderately steep gradient, 3 percent, and very coarse bedded (4 percent sand, 26 percent gravel, 25 percent cobbles, and 46 percent boulder) (NWH 2015). Figure 4.6–16 shows the coarse (i.e., cobbles, boulders) sediment dominated and fine sediment limited the channel at low and higher flows. Annual average movement of sediment from the channel near the proposed diversion was estimated to be relatively low, approximately 2,240 tons/year, and primarily composed of gravel (NWH 2015) (larger material was too coarse to be transported on a regular basis). Downstream at the proposed powerhouse tailrace the channel gradient was much steeper, 5 percent to 10 percent, and the channel bed material was coarser (1 percent sand, 20 percent gravel, 26 percent cobbles, and 54 percent boulders). Figure 4.6–17 shows the coarse channel which is fine sediment limited. Average annual sediment movement from the bed near the proposed powerhouse was estimated to be extremely low, 31 tons/year (approximately 1.5 dump truck loads). Transport capacity in the lower reach is much higher than the estimated sediment movement from the channel bed material; therefore, any sediment moving into the Proposed Project bypass reach from upstream would pass through the steep lower bypass reach without deposition (NWH 2015).

Figure 4.6–16. Stream Channel near the Project Diversion at Low Flow (Top) and High Flows (Bottom) (Source NWH 2015)

Figure 4.6–17. South Fork Battle Creek Channel near the Proposed Powerhouse Tailrace (Source: NWH, 2015)

4.6.2.2 Aquatic Species

Resident Fish

Rainbow trout (*Oncorhynchus mykiss*) are the most abundant and widespread native salmonid in western North America and likely the most widely distributed fish in California. They spawn in spring during high flows and the juveniles rear throughout the year. Rainbow trout can be freshwater resident (referred to as rainbow trout) or anadromous (referred to as steelhead). There is no indication that steelhead have accessed the bypass reach as there are a number of natural barriers immediately below the Proposed Project area (see Fish Passage Barriers Section) and manmade dams at low elevation in the larger Battle Creek Watershed blocking access.

In July 2013, Rugraw completed a detailed aquatic habitat survey in the Proposed Project bypass reach and Rugraw's biologists snorkeled approximately half of the pool channel units (9 out of 20 units), spread evenly throughout the bypass reach. Rainbow trout, which were common throughout the reach, were the only species observed during the survey (Figure 4.6–18). Juvenile rainbow trout measuring 80 to 150 millimeters in fork length were the dominant size class, but larger yearlings (i.e., greater than 150 millimeters) were also observed. A few fish measuring less than 300 millimeters were observed in the deeper pools near the upper extent of the bypass area (i.e., Angel Falls). Quarterly electrofishing surveys by USFWS just upstream of Panther Grade identified rainbow trout and riffle sculpin as the only fish species present in the upper portions of South Fork Battle Creek (Whitton et al., 2010).

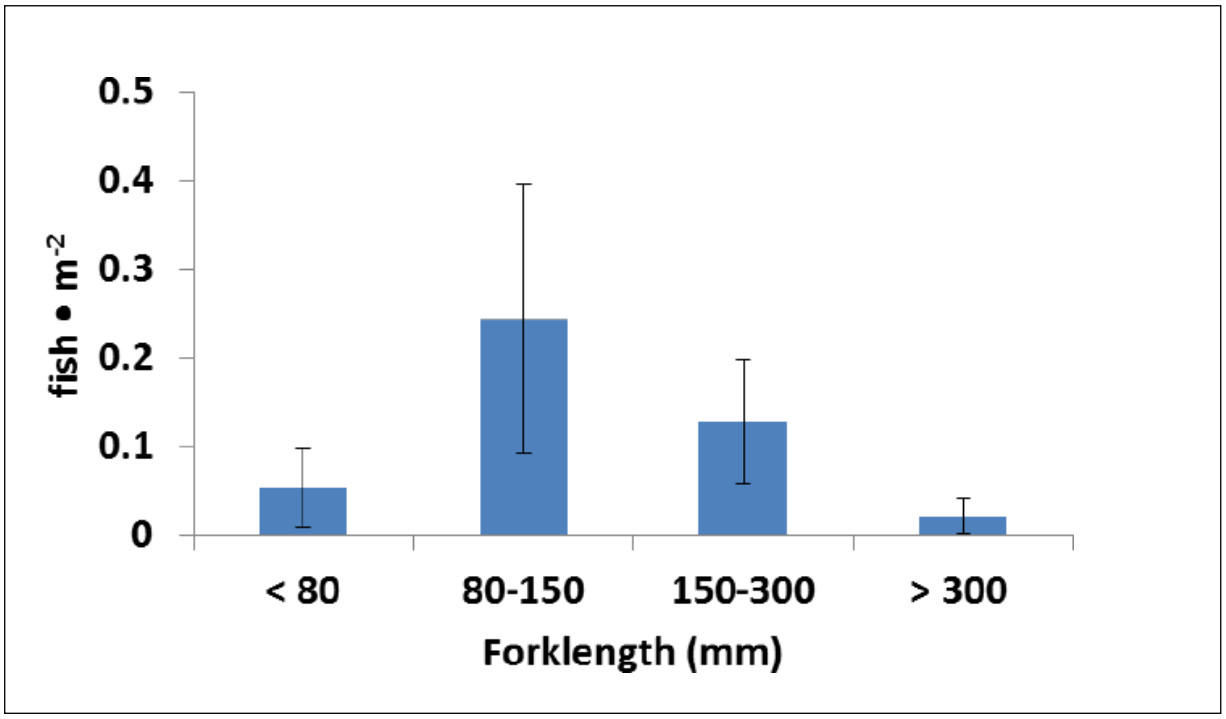

Figure 4.6–18. Snorkel Observations of Rainbow Trout in Representative Pools within the Bypass Reach. Error Bars Indicate 2 Standard Errors (Source: Sellheim and Cramer, 2013)

All rainbow trout observed in the bypass reach in 2013 either died or moved downstream when the stream went dry in summer 2014 and in 2015, and only small juvenile rainbow trout were observed in shallow pools in the lower 0.24 mile of the bypass reach where approximately 0.4 cfs of spring water entered the channel. The dry portions of the bypass reach in 2014 and 2015, and evidence of previous such events in drought years, in combination with the findings of (1) impassable passage barriers below/within the bypass reach, (2) a limited fish assemblage rainbow trout and riffle sculpin (both below and above Angel Falls) compared to 4 to 8 species downstream of Panther Grade (Whitton et al. 2010), indicate that reseeding of trout in the dewatered portion of the bypass reach most likely occurs by fish moving downstream from populations present in the upper watershed.

Special–Status Species

This section provides a summary of special–status fish and other aquatic species known to occur or potentially occurring in the Proposed Project area. For the purposes of this EIR, a special–status species is defined as any animal species that is granted status by a federal, state, or local agency, including:

Federally listed species granted status by USFWS or National Marine Fisheries Service (NMFS) under the ESA include threatened (FT), endangered (FE), proposed threatened or endangered (FPT, FPE), and candidate (FC) species.

State of California listed species which are granted status by the CDFW under the CESA include threatened (CT), endangered (CE), candidates for listing under CESA (CCT, CCE), and California Species of Special Concern (CSC).

Table 4.6–5 shows the status, habitat requirements, and likelihood of occurrence for special–status fish or other aquatic species that could occur within the Proposed Project bypass reach.

Table 4.6–5. Special–Status Aquatic Species Potentially Occurring in the Proposed Project Area

Species (*Scientific name*)	Status	Habitat Requirements	Potential to Occur on Project Lands
Known to Occur in the Project Area			
Amphibians			
Foothill yellow–legged frog (*Rana boylii*) (Northwest/North Coast clade)	CSC	Habitat includes streams, rivers, and pools with cobble–sized rocky substrate. Eggs are attached to gravel or rocks in moving water near stream margins and pool tailouts.	**Known to occur.** Species is known to occur within the Proposed Project area. Probable sighting documented in 2013 surveys at the Old State Highway Route 36 Bridge. Has also been documented downstream in South Fork Battle Creek and Soap Creek. No surveys, however, have been conducted in the Proposed Project area.
California red–legged frog (*Rana draytonii*)	FT, CSC	Found in ponds or along stream edges with ample emergent vegetation within humid forests, woodlands, grasslands, and coastal scrub habitats. Requires slow–moving or calm aquatic habitats, which may be permanent or ephemeral, for breeding.	**Potential to occur in suitable habitat.** Species was not observed during 2013 surveys. Suitable habitat exists at two locations on Proposed Project lands, identified at the Gun and Rod Club Pond (located near the west–central portion of the transmission line corridor, east of Soap Creek) and Manton School Road Pond (located near Manton School Road). The nearest documented occurrence is approximately 44 miles south of the Proposed Project site.
Potential to Occur or Occur in the Future in the Project Area			
Fish			
Chinook salmon (*Oncorhynchus tshawytscha*) Central Valley ESU, spring–run	FT	Streams with deep, low–velocity pools tolerant of a wide variety of temperatures.	**Potential to occur in suitable habitat.** The Proposed Project area does not support any anadromous species under existing conditions due to downstream manmade barriers (e.g., dams). Potential habitat is present in South Fork Battle Creek above

Species (*Scientific name*)	Status	Habitat Requirements	Potential to Occur on Project Lands
			South Dam following dam removal (South Dam, Inskip Dam and Coleman Dam). Natural barriers above South Dam (e.g., Panther Grade, Powerhouse Falls), however, may preclude anadromous fish from entering the lower portion of the Proposed Project area. Angel Falls (natural fish barrier) precludes anadromous fish from entering the upper portion of the Proposed Project area. The lower 0.8–mile of the Proposed Project bypass reach area is located within Critical Habitat for this species. South Fork Battle Creek is designated Magnuson–Stevens Essential Fish Habitat for Chinook salmon.
Steelhead (*Oncorhynchus mykiss*) Central Valley Distinct Population Segment (DPS)	FT	Streams with deep, low–velocity pools tolerant of a wide variety of temperatures.	**Potential to occur in suitable habitat**. The Proposed Project area does not support any anadromous species under existing conditions due to downstream manmade barriers (e.g., dams). Potential habitat is present in South Fork Battle Creek above South Dam following dam removal (South Dam, Inskip Dam and Coleman Dam). Natural barriers above South Dam (Panther Grade, Powerhouse Falls), however, may preclude anadromous fish from entering the lower portion of the Proposed Project area. Angel Falls (natural fish barrier) precludes anadromous fish from entering the upper portion of the Proposed Project area. The lower 1.7 miles of the Proposed Project bypass reach is located within Critical Habitat for this species.

Species (*Scientific name*)	Status	Habitat Requirements	Potential to Occur on Project Lands
Amphibians			
Cascades frog (*Rana cascadae*)	CSC	Inhabits wet mountain areas and lays eggs in shallow stream pools, lake margins, and clear mountain ponds with silty, sandy, or gravelly substrates.	**Potential to occur in suitable habitat**. Species was not observed during 2013 surveys. Potential habitat exists along the entire Proposed Project bypass reach. Nearest mapped occurrence is approximately 3 miles upstream (historic documentation). Populations near Mount Lassen identified in the 1920s may now be extinct.
Unlikely to Occur in the Project Area			
Reptiles			
Western pond turtle (*Actinemys marmorata*)	CSC	Occurs in perennial wetlands and slow–moving creeks and ponds that are at least 1.6 feet deep and support overhanging vegetation and rock outcrops or floating debris for basking from 0 to 6,000 feet in elevation. Nesting habitat includes upland grasslands or open areas in woodlands and forested areas. Good sun exposure, average of 150 feet from aquatic habitats.	**Unlikely to occur.** Species not observed during surveys. Rapid flow and steep banks characterize the majority of the Proposed Project bypass reach. Available nesting habitat is marginal due to a lack of grassy areas and rocky soils. Nearest mapped occurrence approximately 3 miles southwest of the western end of the Proposed Project transmission line right–of–way (ROW).

Notes: CSC = California Species of Special Concern
FT = Federal Endangered Species Act (ESA) include threatened

A brief description of each special–status aquatic species known to occur or with the potential to occur in the Proposed Project area, and the location of the species or its habitat in relation to the Proposed Project Area is provided below.

Foothill Yellow–legged Frog (CSC)

This species frequents rocky streams and rivers with rocky substrate and open, sunny banks, in forests, chaparral, and woodlands. The foothill yellow–legged frog is sometimes found in isolated pools, vegetated backwaters, and deep, shaded, spring–fed pools. It requires at least some cobble–sized substrate for egg–laying, and at least 15 weeks to attain metamorphosis. Eggs are attached to gravel or rocks in moving water near stream margins.

The foothill yellow–legged frog is known to occur within the Proposed Project Area per a probable observation at the Old Highway 36 Bridge (DPA 2012b) and mapped occurrences downstream in South Fork Battle Creek and in Soap Creek (Tetra Tech, 2015c) [16].

California Red–legged Frog (FT, CSC)

The California red–legged frog requires ponds or streamsides with plant cover in humid forests, woodlands, grasslands, and coastal scrub. Breeding habitat is in permanent or ephemeral water sources: lakes, ponds, reservoirs, slow streams, marshes, bogs, and swamps. The California red–legged frog occurs at elevations from sea level to 5,000 feet (1,525 meters).

This species was not observed during field surveys conducted in 1996, 1998 and 2013 (DPA 1996, DPA 1998, in FERC 2018[3]). In addition, field surveys were conducted in 2013 using the USFWS's Revised Guidance on Site Assessments and Field Surveys for the California Red–legged Frog. A California Red–legged Frog Site Assessment Report was submitted to USFWS under separate cover (Tetra Tech 2013b in FERC 2018). Surveyors did not observe this species. Of the six sites surveyed, suitable habitat was identified at the Gun and Rod Club Pond and Manton School Road Pond. The Gun and Rod Club Pond is located near the west–central portion of the transmission line corridor, east of Soap Creek. Manton School Road Pond is located near Manton School Road. The nearest mapped occurrence is approximately 44 miles southeast of Paradise, CA, in Butte County.

Chinook Salmon (Spring–Run Central Valley Evolutionarily Significant Unit) (FT)

Central Valley spring–run Chinook salmon adult migration occurs in the Sacramento River from late March to July, primarily in May and June and they over–summer in cold water habitats. Spring–run Chinook salmon spawn from mid–August to early October, with peak spawning occurring in September (Moyle 2002). Incubation occurs from mid–August to mid–March, with rearing and emigration occurring from mid–August through April. Chinook salmon require cold, freshwater streams with suitable gravel for reproduction. Females deposit their eggs in nests in gravel–bottom areas of relatively swift water. For maximum survival of incubating eggs and larvae, water temperatures must be between 41°F and 55.4°F (Moyle 2002). After emerging between November and March, Chinook salmon fry tend to seek shallow, nearshore habitat with slow water velocities and move to progressively deeper, faster water as they grow. Spring–run

[16] See Appendix C of Tetra Tech's report (Tetra Tech, 2015c) for copy of FERC letter of November 25, 2014, denying CDFW late request for additional foothill yellow–legged frog studies and approving of Applicants plan for pre–construction surveys, as noted therein.

juveniles frequently reside in freshwater habitat for 12 to 16 months (stream–type), but many young migrate to the ocean during the spring within five to eight months of hatching (ocean–type). The San Francisco Bay Estuary and San Joaquin Delta are important rearing areas for these migrants. Chinook salmon spend two to four years maturing in the ocean before returning to their natal streams to spawn. All adult salmon die after spawning (Moyle 1976; Allen and Hassler 1986).

Spring–run Chinook salmon are currently unable to access the Proposed Project Area due to existing downstream manmade and natural barriers. The most upstream passage barrier is the South Diversion Dam on South Fork Battle Creek, 6 RM below the Proposed Project Area. Even with the removal of downstream manmade barriers, spring–run Chinook salmon may not be able to access the Proposed Project Area due to natural fish passage barriers upstream of South Diversion Dam (see Impact 4.6–2, Fish Barriers).

Critical Habitat

Critical habitat for Chinook salmon was designated on September 2, 2005 (70 FR 52488) and extends 0.8–mile into the Proposed Project bypass reach on South Fork Battle Creek up to RM 21.4 (Figure 4.6–2). Chinook salmon currently do not have access to the critical habitat designated in the Proposed Project Area due to downstream barriers (manmade and natural), and historical use of this habitat by Chinook salmon prior to dam construction is unknown. Regardless, the suitability and condition of the habitat in the designated critical habitat area are assessed in this section. Based on the natural history and habitat needs of the Central Valley Chinook salmon ESU, six physical or biological features have been identified as essential for their conservation. Freshwater habitats in the Proposed Project Area contain only a subset of the identified physical or biological features for Central Valley Chinook salmon ESU. Three primary constituent habitat elements (PCEs) for Chinook salmon are found near the Proposed Project Area as summarized below.

- **PCE 1:**[17] Freshwater spawning sites with water quantity and quality conditions and substrate supporting spawning, incubation and larval development.
- **PCE 2:**[18] Freshwater rearing sites with:
    - Water quantity and floodplain connectivity to form and maintain physical habitat conditions and support juvenile growth and mobility;
    - Water quality and forage supporting juvenile development; and
    - Natural cover such as shade, submerged and overhanging large wood, log jams and beaver dams, aquatic vegetation, large rocks and boulders, side channels, and undercut banks.
- **PCE 3:**[19] Freshwater migration corridors free of obstruction and excessive predation with water quantity and quality conditions and natural cover such as submerged and

[17] PCE 1 is potentially present in the Proposed Project Area.
[18] PCE 2 is potentially present in the Proposed Project Area.
[19] PCE 3 is potentially present in South Fork Battle Creek leading up to and including the Proposed Project Area.

overhanging large wood, aquatic vegetation, large rocks and boulders, side channels, and undercut banks supporting juvenile and adult mobility and survival.

- **PCE 4:**[20] Estuarine areas free of obstruction and excessive predation with:
  - Water quality, water quantity, and salinity conditions supporting juvenile and adult physiological transitions between fresh– and saltwater;
  - Natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, side channels; and
  - Juvenile and adult forage, including aquatic invertebrates and fishes, supporting growth and maturation.
- **PCE 5:**[21] Nearshore marine areas free of obstruction and excessive predation with:
  - Water quality and quantity conditions and forage, including aquatic invertebrates and fishes, supporting growth and maturation; and
  - Natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, and side channels.
- **PCE 6:**[22] Offshore marine areas with water quality conditions and forage, including aquatic invertebrates and fishes, supporting growth and maturation.

Steelhead Central Valley Distinct Population Segment (FT)

Central Valley steelhead adult spawning migration occurs from July through February. Spawning occurs from December through April and, possibly in May, in most years in streams with cool, year–round, well–oxygenated water (Reclamation, BLM, and WSRCD 2006). Incubation generally occurs from December through April. Following emergence, fry live in small schools in shallow water along streambanks. As the steelhead grow, they establish individual feeding territories. Juvenile steelhead typically rear for one to two years in streams before emigration, which generally occurs in spring. Steelhead may remain in the ocean from one to four years, growing rapidly as they feed in the highly productive currents along the continental shelf (Barnhart 1986). Steelhead return to natal streams to spawn as two to four year–old adults.

Anadromous steelhead are currently unable to access the Proposed Project area due to existing downstream barriers. The most upstream passage barrier is the South Diversion Dam on South Fork Battle Creek, 6 RM below the action area[23]. Steelhead may not be able to access the Proposed Project area due to natural fish passage barriers upstream of South Diversion Dam (see Impact 4.6–2 Anadromous Fish Passage Barriers). A population of resident rainbow trout was the only fish species observed in the reach during the stream habitat surveys, but quarterly

[20] PCE 4 is not found near the Proposed Project Area.
[21] PCE 5 is not found near the Proposed Project Area.
[22] PCE 6 is not found near the Proposed Project Area.
[23] Action area is an Endangered Species Act (ESA) consultation term that refers to the area directly or indirectly affected by the proposed action. This area will usually be larger than the project footprint.

electrofishing surveys by the USFWS just upstream of Panther Grade have also found riffle sculpin in addition to rainbow trout (Whitton et al. 2010).

Anadromous steelhead are currently unable to access the Proposed Project bypass reach due to existing downstream manmade barriers. The most upstream manmade passage barrier is the South Diversion Dam on South Fork Battle Creek. Steelhead may not be able to access the Proposed Project Area due to natural fish passage barriers upstream of South Diversion Dam (see Impact 4.6–2 Fish Passage Barriers). A population of resident rainbow trout was the only fish species observed in the bypass reach during recent stream habitat surveys (Sellheim and Cramer 2013), but quarterly electrofishing surveys by the USFWS just upstream of Panther Grade have found rainbow trout and riffle sculpin (Whitton et al. 2010).

Steelhead would be the most likely anadromous species to potentially access the reach above Panther Grade and Powerhouse Falls (natural barriers), based on its ability to pass through difficult migratory barriers. The smaller gravel patch sizes in the Proposed Project bypass reach would be more suitable for steelhead than the larger–bodied Chinook salmon. The natural barriers may be passable during uncommonly high flows; however, whether steelhead would perform upstream migration during such high flow events is in question (Tetra Tech 2015b). Agency personnel (e.g., NMFS and USFWS) have suggested that this barrier may be passable during extreme flow events was based on visual observations; however, this conclusion has neither been proved nor rebutted.

The timing of both the upstream migration and spawning for steelhead dramatically reduces their exposure to high stream temperatures as compared to spring–run Chinook salmon and allows them to take advantage of higher flows. Further, because steelhead are smaller, they are able to use smaller patches of gravel, shallower depths, and slower velocities for spawning. Thus, the prospects of steelhead to encounter favorable conditions for migration and spawning are greater than those for spring–run Chinook salmon. However, they still would face a strong limitation to rearing from low summer flows, and they would have to share the available habitat with the rainbow trout population that currently inhabits the bypass reach.

Critical Habitat

Critical habitat for the Central Valley steelhead was designated by NMFS on September 2, 2005 (70 FR 52488) and overlaps 1.7 miles of the Proposed Project bypass reach extending up to Angel Falls at RM 22.3 (Figure 4.6–2). Steelhead currently do not have access to the critical habitat designated in the Proposed Project Area due to downstream barriers (manmade and natural), and the historical use of this habitat by steelhead is unknown. Regardless, the suitability and condition of the habitat in the designated critical habitat is assessed in this section. Based on the natural history and habitat needs of the Central Valley steelhead, six physical or biological features have been identified as essential for their conservation. Freshwater habitats in the action area contain only a subset of the identified physical or biological features for Central Valley steelhead DPS. Three PCEs for steelhead that are found in the Project Area are described below.

- **PCE 1:**[24] Freshwater spawning sites with water quantity and quality conditions and substrate supporting spawning, incubation and larval development. These features are

[24] PCE 1 is potentially be present the Proposed Project Area.

essential to conservation because without them the species cannot successfully spawn and produce offspring.

- **PCE 2:**[25] Freshwater rearing sites with:
  - Water quantity and floodplain connectivity to form and maintain physical habitat conditions and support juvenile growth and mobility;
  - Water quality and forage supporting juvenile development; and
  - Natural cover such as shade, submerged and overhanging large wood, log jams and beaver dams, aquatic vegetation, large rocks and boulders, side channels, and undercut banks.
  - These features are essential to conservation because without them juveniles cannot access and use the areas needed to forage, grow, and develop behaviors (e.g., predator avoidance, competition) that help ensure their survival.
- **PCE 3:**[26] Freshwater migration corridors free of obstruction with water quantity and quality conditions and natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, side channels, and undercut banks supporting juvenile and adult mobility and survival.

  These features are essential to conservation because without them juveniles cannot use the variety of habitats that allow them to avoid high flows, successfully compete, begin the behavioral and physiological changes needed for life in the ocean, and reach the ocean in a timely manner. Similarly, these features are essential for adults because they allow fish in a non–feeding condition to successfully swim upstream, avoid predators, and reach spawning areas on limited energy stores.
- **PCE 4:**[27] Estuarine areas free of obstruction with:
  - Water quality, water quantity, and salinity conditions supporting juvenile and adult physiological transitions between fresh– and saltwater;
  - Natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, side channels; and
  - Juvenile and adult forage, including aquatic invertebrates and fishes, supporting growth and maturation.
  - These features are essential to conservation because without them juveniles cannot reach the ocean in a timely manner and use the variety of habitats that allow them to avoid predators, compete successfully, and complete the behavioral and physiological changes needed for life in the ocean. Similarly, these features are essential to the conservation of adults because they provide a final source of abundant forage that would provide the energy stores needed to make the physiological transition to fresh

[25] PCE 2 is potentially be present the Proposed Project Area.
[26] PCE 3 is potentially be present South Fork Battle Creek leading up to and including the Proposed Project Area.
[27] PCE 4 is not found near the Proposed Project Area.

water, migrate upstream, avoid predators, and develop to maturity upon reaching spawning areas.

- **PCE 5:**[28] Nearshore marine areas free of obstruction with:
  - Water quality and quantity conditions and forage, including aquatic invertebrates and fishes, supporting growth and maturation; and
  - Natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, and side channels.
  - As in the case with freshwater migration corridors and estuarine areas, nearshore marine features are essential to conservation because without them juveniles cannot successfully transition from natal streams to offshore marine areas.
- **PCE 6:**[29] Offshore marine areas with water quality conditions and forage, including aquatic invertebrates and fishes, supporting growth and maturation.

  These features are essential for conservation because without them juveniles cannot forage and grow to adulthood. However, for the reasons stated previously in this document, it is difficult to identify specific areas containing this PCE as well as human activities that may affect the PCE condition in those areas. Therefore, specific areas based on this PCE have not designated but instead have identified it because it is essential to the species' conservation and specific offshore areas may be identified in the future (in which case any designation would be subject to separate rulemaking).

Cascades Frog (CSC)

The Cascades frog inhabits wet mountain areas in open coniferous forests to near timberline, including small streams, small pools in meadows, lakes, bogs, ponds, and marshy areas near streams. The Cascades frog is typically found in water with no predatory fish. Standing water is required for reproduction. The Cascades frog hibernates in mud on the bottom of lakes and ponds during the winter. Eggs are laid in shallow stream pools, lake margins, and clear mountain ponds with silty, sandy, or gravelly substrates.

No Cascades frogs were observed during previous surveys in the Proposed Project Area. Potential habitat exists along the entire Proposed Project bypass reach, with potential breeding habitat present in stream pools. Rainbow trout are present within South Fork Battle Creek and would be predators of Cascades frogs. The nearest documented occurrence of Cascades frog is approximately three miles upstream of the Proposed Project diversion dam (historic). Populations near Mount Lassen identified in the 1920s may now be extinct (California Herps 2013 in Tetra Tech 2015b).

Western Pond Turtle (CSC)

Western pond turtle is found in ponds, lakes, rivers, streams, creeks, marshes, and irrigation ditches, with abundant vegetation, and either rocky or muddy bottoms, in woodland, forest, and grassland. The western pond turtle requires a permanent water source. In streams, it prefers pools to shallower areas. Logs, rocks, cattail mats, and exposed banks are required for basking.

[28] PCE 5 is not found near the Proposed Project Area.
[29] PCE 6 is not found near the Proposed Project Area.

Habitat requirements of the western pond turtle also include sandy banks or grassy open fields up to 0.5 kilometer from the water for egg– laying.

The western pond turtle was not observed during previous surveys in the Proposed Project Area. Due to the rapid flow and steep boulder banks that characterize the majority of the bypass reach (Figure 4.6–16, Figure 4.6–17), this species is not expected to occur. Available nesting habitat is marginal due to a lack of grassy areas and rocky soils. The nearest documented occurrence is approximately three miles southwest of the western end of the Proposed Project transmission line right–of–way.

4.6.3 Regulatory Setting

4.6.3.1 Federal

Federal Endangered Species Act of 1973 (FESA)

The FESA and its implementing regulations include provisions for the protection and management of federally listed threatened or endangered species and their designated critical habitats. Section 7 of the FESA requires a permit to take threatened or endangered species during lawful project activities. The administering agency for the above authority is the USFWS for terrestrial, avian, and most aquatic species and the NMFS for anadromous and marine species.

Fish and Wildlife Coordination Act

The Fish and Wildlife Coordination Act (16 U.S.C. § 661 et seq.) amended 1946, 1958, 1978, and 1995 requires federal agencies to consult with the USFWS, or, in some instances, with NMFS, and with state fish and wildlife resource agencies before undertaking or approving water projects that control or modify surface water. The purpose of this consultation is to ensure that wildlife resources held in public trust receive appropriate consideration and be coordinated with the features of these water resource development projects. Federal agencies undertaking water projects are required to fully consider recommendations made by the USFWS, NMFS, and state fish and wildlife resource agencies in project reports, such as documents prepared to comply with NEPA and CEQA, and to include measures to reduce impacts on wildlife in project plans.

Section 7 of the Fish and Wildlife Coordination Act requires consultation if any federal nexus exists on a project that could jeopardize the continued existence of a listed species. Applicability depends on federal jurisdiction over some aspect of the project. Coordination under the Fish and Wildlife Coordination Act occurs between the federal lead agency (e.g., U.S. Army Corps of Engineers [USACE]) and either NMFS and/or the USFWS depending on the species involved.

Clean Water Act

Section 404 of the federal Clean Water Act (CWA) establishes a requirement for a project applicant to obtain a permit before engaging in any activity that involves any discharge of dredged or fill material into “waters of the United States” including wetlands.

Section 401 of the CWA specifies that any applicant for a federal license or permit to conduct any activity that may result in discharge to navigable waters will provided the federal licensing or permitting agency with a certifications that any such discharge will not violate state water quality standards. The Regional Water Quality Control Board generally administers the Section 401 program and prescribes measures for project that are needed to avoid, minimize, and mitigate

adverse impacts on water quality. However, in the case of hydropower projects and other projects involving water rights, the State Water Board administers the issuance of a 401 certification.

Further details about Section 404 and 401 are provided under the "Regulatory Setting" discussion in Section 4.13, Hydrology and Water Quality.

Magnusson–Stevenson Fishery Conservation and Management Act 1996 (Public Law 94–265)

This law provides for the conservation and management of all fish resources within the exclusive economic zone of the United States and supports and encourages the implementation and enforcement of international fisheries agreements for conservation and management of highly migratory species. It called for the establishment of Regional Fisheries Management Councils to develop, implement, monitor, and revise fish management plans to promote domestic commercial and recreational fishing. Specific to this program, it calls for the protection of Essential Fish Habitat in review of projects conducted under federal permits, licenses, or other authorities that affect or have the potential to affect such habitat. NMFS is responsible for the administration of the act.

4.6.3.2 State

California Endangered Species Act (CESA)

The CESA declares that deserving species will be given protection by the State because they are of ecological, educational, historical, recreational, aesthetic, economical, and scientific value of the people of the State. The CESA establishes that it is state policy to conserve, protect, restore, and enhance endangered species and their habitat. Under state law, wildlife species may be formally designated as threated or endangered by official listing by the California Fish and Game Commission. Listed species are generally given greater attention during the land use planning process by public agencies compared to species that are not currently listed.

Section 2081, subdivision (b) and (c) of the CESA allows CDFW to issue a take permit for state listed threatened and endangered species only if specific criteria are met. These criteria can be found in California Code of Regulations, title 14, section 783.4, subdivisions (a) and (b). No section 2081, subdivision (b) permit may authorize the take of "fully protected" species. If a project is planned in an area where fully protected species occurs, the project must be designed to avoid all take because CDFW cannot provide take authorization under the CESA.

Fish and Game Code of California

The Fish and Game Code provides specific protection of and listing for several types of biological resources. Section 1580 of the Fish and Game Code presents the process and definition for Designated Ecological Reserves. Designated Ecological Reserves are significant wildlife habitats to be preserved in natural condition for the general public to observe and study.

Section 1602 of the California Fish and Game Code requires that all diversion, obstructions, or changes to the natural flow or bed, channel, or bank of any river, stream, or lake in California that supports wildlife resources are subject to regulation by CDFW.

California Wetlands Conservation Policy (Executive Order W–59–93)

In 1993, Governor Pete Wilson signed Executive Order W–59–93, the state's "No Net Loss" policy for wetlands and streams, establishing a State Wetland Conservation Policy and providing comprehensive direction for the coordination of state–wide activities for the preservation and protection of wetland and stream habitats.

On April 2, 2019, consistent with Executive Order W–59–93, the State Water Board adopted the State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State. These rules provide a common, statewide definition of what constitutes a wetland and to provide consistency in the way the State Water Board and nine regional water boards regulate activities to protect wetlands and other waterways, such as rivers and streams, and bays and estuaries. The rules define what is considered a wetland; include a framework for determining if a feature defined as a wetland is a "water of the state" subject to regulation; and clarify requirements for permit applications to discharge dredged or fill material to any water of the state.

4.6.3.3 Local

The Tehama County General Plan, Open Space and Resource Conservation Element contains the following policies and implementation measures related to aquatic resources:

- *Policy OS–1.1:* Tehama County shall protect and conserve water resources and supply systems through sound watershed management.
    - *Implementation Measure OS–1.1c:* Ensures that projects adhere to all state and federal Regulations.
- *Policy OS–3.1:* Tehama County shall preserve and protect environmentally–sensitive and significant lands and water valuable for their plant and wildlife habitat, natural appearance, and character.
    - *Implementation Measure OS–3.1e:* Tehama County will work with responsible agencies to create Biological Resources Mitigation Guidelines. The guidelines shall include the following:
        - Mitigation of impacts to special–status species where they are found or are likely to occur;
        - Standard mitigation measures to direct special–status species surveys, including survey timing and protocols;
        - Measures designed to preserve areas identified as containing sensitive habitat, or in which special–status species are known to be present or likely to occur; and
        - Methodology to encourage the preservation of existing waterways and discourage extensive or absolute relocation or channelization of creeks, rivers and waterways.
    - *Implementation Measure OS–3.1f:* Require a biological survey be conducted by the project applicant to identify potentially occurring special–status species or their habitat. The results of the survey shall be documented in a Biological Resources Report.

- *Policy OS–3.7:* Tehama County shall promote best management practices of natural resources that will enhance wildlife habitat.
    - *Implementation Measure OS–3.7a:* Water diversions/dams constructed along anadromous fish streams shall be designed to protect fish populations and to ensure adequate flow levels for spawning activity during migratory seasons in accordance with state and federal regulations.

4.6.4 Analysis Methodology

The following analysis considers direct and indirect effects of implementation of the Proposed Project and Alternatives. Potential impacts are analyzed using information identified in the Proposed Project description, the environmental setting for aquatic and fisheries resources, relevant literature sources and field surveys.

This section also includes evaluation of the Proposed Project alternatives relative to aquatics and fisheries resources. Chapter 3 of this document provides detailed descriptions and the rationale of each alternative. In summary, the alternatives evaluated include:

- **No Project Alternative**: The No Project Alternative under CEQA is defined as what would reasonably be expected to occur in the foreseeable future, based on current plans and consistent with available infrastructure and community services, if the project was not approved and implemented.
- **Alternative 1 – Minimum Instream Flow**: Alternative 1 proposes a minimum instream flow (MIF) of 25 to 35 cfs year–round compared to the Proposed Project MIF of 13 cfs year–round.
- **Alternative 2 – Ramping Rates**: Alternative 2 consists of analyzing: (1) Proposed Project–induced down ramping rates specifically to protect stranding of fish and dewatering of foothill yellow–legged frog egg masses/young tadpoles and fish redds, and (2) Proposed Project–induced ramping rates specifically to protect foothill yellow–legged frog egg masses and public safety. In Alternative 2, a 1.0 inch per hour down ramping rate is analyzed to evaluate potential Project–induced fish stranding for fry and a down ramping rate of 4.0 inches over 7 days (1.0 foot per month; April 15 through July 15) (Yarnell et al., 2016) is analyzed to evaluate potential foothill yellow–legged frog egg mass/tadpole dewatering.
- **Alternative 3 – Temperature Project Shutdown Thresholds**: Alternative 3 further evaluates the appropriate Proposed Project temperature shutdown criteria to protect aquatic species and lifestages during various seasons and incorporates into those criteria a mechanism that allows empirical data to be used to determine if the Proposed Project is cooling water temperature in the reaches (beneficial effect; no Proposed Project shutdown) and/or warming water temperature in the reaches (negative effect; Proposed Project shutdown).

4.6.4.1 Criteria for Determining Significance

Significance criteria were developed based on Appendix G of the CEQA Guidelines, and applicable regulations and management policies, a review of the available information, and the professional judgment of the authors. The following impact criteria were used to evaluate the

potential effects on fish and aquatic resources resulting from implementation of the Proposed Project or its alternatives, including the No Project Alternative (existing conditions):

- Cause 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 CDFW, NMFS, or USFWS;
- 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;
- Result in a net permanent loss of wetland or streams;
- Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance; or
- Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.

4.6.5 Applicant's Proposed Measures

The Proposed Project Description (Chapter 2) includes Applicant–Proposed Measures (Section 2.3.4) and Other Environmental Management and Monitoring Plans (Section 2.3.5) as part of the Proposed Project to minimize impacts to fisheries and aquatic resources. Relevant measures and management and monitoring plans are summarized below.

- General Construction Measures
  - Develop a construction plan.
  - Limit land and vegetation disturbance.
  - Restore vegetation.
  - Develop Stormwater Pollution Protection Plan (SWPPP).
  - Use existing roads and minimize new roads.
  - In–water work to occur July 1 – October 15.
- Biological Resources Protection Measures
  - Maintain upstream and downstream fish passage during construction.
  - Conduct monitoring during construction.
  - Provide environmental training.
  - Conduct pre–construction inspections.
  - Avoid aquatic habitats to the extent possible.
  - Monitor tailrace fish behavior.
- Amphibian Protection Measures
  - Conduct pre–construction surveys for all life stages (egg masses, larvae, juveniles, and adults) of foothill yellow–legged frog, Cascades frog, and California red–legged frog.

  - Avoid construction activities during the time that egg masses of foothill yellow–legged frog, Cascades frogs, and California red–legged frog are present.

- Other Environmental Management and Monitoring Plans
  - Anadromous Fish Monitoring Program.
  - Water Temperature Monitoring Plan.
  - Special–Status Amphibian Protection Plan.
  - Turbidity and pH Monitoring Plan.
  - Aquatic and Invasive Species Monitoring Plan.
  - Debris and Sediment Management Plan.
  - Erosion Control and Sedimentation.

4.6.6 Environmental Impacts and Mitigation

4.6.6.1 Impacts Related to Special–status Species or Their Habitats

IMPACT 4.6–1: Would the Proposed Project 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 or USFWS?

Construction Impacts

Physical Habitat

Potential water quality and hydrology impacts associated with construction of the Proposed Project are addressed in *Section 4.13, Hydrology and Water Quality*. Water quality and hydrology (stream flows) would be maintained throughout construction.

The Proposed Project is located within the range of California red–legged frog; however, construction associated with the Proposed Project is unlikely to directly affect the species considering that a 2013 protocol survey did not detect any evidence of this species (Tetra Tech 2015). Also, at locations where suitable habitat exists, including the Gun and Rod Club Pond (located 450 feet south of the Proposed Project transmission line alignment) and the Manton School Road Pond (located approximately 200 feet north of the Proposed Project transmission alignment), conditions were not favorable for the survival of the species because of the presence of predatory fish and bullfrogs. Furthermore, the Gun and Rod Club Pond is approximately 200 feet from the proposed transmission line route, approximately ten miles from the proposed diversion dam construction site, and would not be directly affected by construction activities. The Manton School Road Pond is located on Manton School Road, approximately 200 feet away from the proposed transmission line route. Marginal habitat at the South Fork Battle Creek diversion and intake location is not likely to support California red–legged frog because of the physical characteristics of the site, including swift flow and minimal pool, emergent vegetation, or cover habitat.

The area proposed for the diversion dam and pool is potential habitat for other special–status species (foothill yellow–legged frog, Cascades frog, California red–legged frog, and Western pond turtle) and resident fish (rainbow trout and sculpin), The diversion dam and pool would be located on South Fork Battle Creek at RM 23, approximately 0.5 RM upstream of the Old State Highway Route 36 Bridge (RM 22.5), at the location of an abandoned logging flume. Proposed Project construction activities include cofferdam construction and dewatering, and excavation and dredging in the river channel, which could affect fish passage, water temperature, aquatic habitat, sediment, and large woody debris[30]. Rugraw would confine in–water work activities during the low flow period between July 1 and October 15, which would help manage activities that could cause adverse effects on physical habitat. Rugraw would maintain upstream and downstream fish passage during construction, by constructing fish passage facilities first before constructing the remainder of the diversion/intake structure, or by constructing a temporary diversion culvert if the entire diversion/intake structure is constructed as one unit in the dry. Further, Rugraw plans to complete Proposed Project construction within six months, and the footprint of the diversion dam and pool construction would be relatively small (approximately 0.34 acre). Rugraw would restore disturbed stream and riparian habitat to pre–construction conditions. In addition, Rugraw would provide environmental training to staff, conduct preconstruction inspections, and avoid aquatic habitat to the extent possible.

Construction of the diversion dam would create a small diversion pool of approximately 0.4 acre with negligible storage. Although this small impoundment would replace existing stream habitat, this new habitat would be similar to other pools within South Fork Battle Creek and overall would not have a substantial effect on stream habitat in the creek.

With compliance with Applicant–proposed measures, the construction effects on physical habitat related to water quality and hydrology in the Proposed Project area would be less than significant. Any effects of construction on physical habitat would be small, temporary in nature, and minimized by the Applicant–proposed measures and would be unlikely to have long–term effects on fish passage, water temperature, aquatic habitat, sediment, and large woody debris.

Construction Impacts – Physical Habitat

- **Level of Significance:** Less than Significant Impact
- **Mitigation Measures:** None required

Biological

As discussed above, construction effects on aquatic physical habitat are less than significant with implementation of Rugraw's environmental measures; however, direct effects to aquatic species could occur. Construction activities could adversely affect aquatic species populations (e.g., special–status species, resident fish, amphibians macroinvertebrates,) through temporary displacement and/or mortality associated with cofferdam construction and dewatering, excavation and dredging in the river channel, and erosion and runoff from adjacent disturbed

[30] Note that a wide variety of aquatic species use large woody debris or the slow water habitats created by large woody debris for habitat (e.g., macroinvertebrates, fish, amphibians, and aquatic reptiles).

areas. Increases in suspended sediment could reduce aquatic habitat suitability downstream of the construction area, cover fish/amphibian eggs, and clog the gills of macroinvertebrates.

As part of the construction plan (Section 2.3.4.1), Rugraw will develop a SWPPP that outlines best management practices (BMPs) to prevent erosion and sedimentation during construction. The SWPPP would include provisions for using cofferdams, silt fences, limiting vegetation removal, installing energy dissipaters and other structures to isolate in–water work areas. The Rugraw–proposed construction plan and other proposed measures or plans do not; however, specifically address compliance and monitoring for increases in turbidity, suspended sediment, settleable material, pH, or dissolved oxygen amounts that could directly affect organisms. Similarly, they do not identify stop–work or remedial methods for addressing identified water quality problems. As a result, related impacts would be significant. Recommended Measure AQU–1 below addresses these issues.

Rugraw would also confine in–water work activities to between July 1 and October 15, which is the low–flow period, to minimize effects on aquatic species. Rugraw proposes to maintain upstream and downstream fish passage during construction which would allow fish movement. In addition, Rugraw will avoid aquatic habitats to the extent possible, conduct monitoring/pre–inspections for special–status species, train staff to protect aquatic species, implement amphibian protection measures that, along with pre–construction surveys, include stopping work and notifying USFWS within 24 hours if California red–legged frog are observed, relocate juveniles and adults (e.g., foothill yellow–legged frogs, California red–legged frogs, and Cascades frogs) as needed and avoid breeding areas during breeding season (e.g., mid–April to mid–May). The Biological Resources Protection Measure also requires the presence of biological monitors to ensure that measures for the protection of aquatic species are implemented. A Special–status Amphibian Protection Plan will also be developed in consultation with agencies that would address protocols for preconstruction surveys, stopping work, species handling, and relocation. An aquatic invasive species plan will include construction BMPs to help prevent the introduction and/or spread of aquatic nuisance species into the Proposed Project Area (e.g., bullfrog), and protocols to decontaminate equipment that could spread chytrid fungus.

Overall, some fish may be displaced by cofferdam construction, dewatering of the construction area, and excavation of the riverbed. However, most of the resident fish in the bypass reach would have the ability to move out of the construction zone (fish passage will be maintained at the diversion site). The in–water construction footprint would be small, limiting potential adverse effects on immobile aquatic organisms. Special–status species amphibians (foothill yellow–legged frog, California red–legged frogs, Cascades frog) would be protected by the amphibian measures. Special–status anadromous fish would not be present at the diversion dam site where in–water construction would occur as the dam is upstream of Angel Falls, which is a complete anadromous fish barrier.

Rugraw's proposed construction activities would affect a few individual resident fish and macroinvertebrates and would not adversely affect local populations and special–status species. The proposed construction plan and other proposed measures or plans do not specifically address compliance and monitoring for increases in turbidity, suspended sediment, settleable material, pH, or dissolved oxygen amounts that could directly affect organisms. Similarly, they do not identify stop–work or remedial methods for addressing identified water

quality problems. As a result, impacts related to construction effects on aquatic species would be significant without mitigation. Recommended Measure AQU–1 would reduce this impact to less than significant with mitigation by requiring Rugraw to implement specific remedial actions in response to water quality monitoring; however, Rugraw has not approved of this measure, so the impact would be significant and unavoidable.

Construction Impacts – Biological

- **Level of Significance:** Significant and Unavoidable
- **Recommended Measure AQU–1: Water Quality Monitoring and Compliance.** The following mitigation measures would be included in the Proposed Project Turbidity and pH Monitoring Plan:
    - Monitoring of turbidity, suspended sediment, settleable material, pH, and dissolved oxygen during construction;
    - Compliance with the Central Valley Basin Plan (CVRWQCB, 2018) water quality criteria for turbidity, suspended sediment, settleable material, pH and dissolved oxygen during construction;
    - Stop–work conditions and remedial approaches for water quality non–compliance; and
    - Reporting of construction water quality monitoring results to CDFW and State Water Board.

Operational Impacts

Proposed Project operation would reduce up to 105 cfs of streamflow in the 2.4–mile–long bypass reach between the diversion dam and the powerhouse by routing water diverted at the dam through a buried pipeline–penstock system to the powerhouse. A minimum flow of 13 cfs (or natural flow, whichever, was less) would be maintained in the bypass reach. Diversions would begin when flows at the diversion dam reach 18 cfs (the powerhouse needs a minimum of 5 cfs to operate). Once flows exceeded 418 cfs, diversions would cease. The Proposed Project would operate in a run–of–river mode whereby the sum of all outflows from the Proposed Project would approximate the sum of all inflows to the Proposed Project at any given time. By operating as run–of–river, the Proposed Project would not store water or divert water for any purpose other than hydropower. The Proposed Project would result in changes in flow in the bypass reach. During changes in flow at the diversion, a ramping rate of one inch/hour would be maintained in the river downstream of the diversion dam (note: as a result, ramping would also occur downstream of the powerhouse tailrace as flows out of the powerhouse were gradually ramped). The Proposed Project's turbine would continue releasing flows from the powerhouse under a load rejection, thereby minimizing changes in flow downstream of the Proposed Project. During Proposed Project operations, streamflow would not be affected downstream of the powerhouse, with the exception of the start–up of flow diversions. During initial project start–up, or after extended periods of shut–down when the pipeline/penstock has been drained, flow downstream of the powerhouse would be reduced while refilling the pipeline and penstock with water, although this would likely be relatively brief. The impacts of the Proposed Project operations on the physical environment and biological resources are addressed below.

Physical Environment

Fish Passage Barriers

Potential fish passage barriers are discussed in Impact 4.6–2.4

Hydrology

Figure 4.6–19, Figure 4.6–20, Figure 4.6–21, and Figure 4.6–22 show time series and monthly exceedance plots of daily average flows in the bypass reach under the Proposed Project, Alternative 1, and No Project for the synthetic hydrology (1929 to 2004) and 2015 to 2019 measured hydrology period of record (POR). The least amount of change, as a result of the Proposed Project, occurs during the low flow season, August through December, and the greatest amount of flow change occurs in the wetter season, January through July. Under the Proposed Project, minimum flows (less than13 cfs to 18 cfs) occur 70 percent of the time or more in all months except April and May, where minimum flows occur approximately 50 percent of the time. High flows greater than 418 cfs are not affected by the Proposed Project and occur in the Proposed Project, Alternative 1, and No Project in 40 of 92 years (42 percent of the years) (1926–2019) and in the years when they do occur the average is 3.1 days/year (minimum 1 day/year and maximum 10 days/year) (Table 4.6–6). High flows (greater than 418 cfs) occur less than 1 percent of the time, and therefore, do not show up on the exceedance plots that go from 1 percent to 99 percent exceedance. Effects of hydrology on water quality, water temperature, aquatic habitat, and sediment/large woody debris transport related to aquatic habitat are addressed below.

Water Quality

Water quality issues are most prevalent during the summer/fall low flow period. Rugraw measured water quality during summer/fall low flows (4 to5 cfs and 13 cfs) in the Proposed Project bypass reach. The Proposed Project incorporates a minimum instream flow requirement of 13 cfs (or natural flow if it is lower than 13 cfs), and during the low flow summer/fall period (Figure 4.6–19, Figure 4.6–20, Figure 4.6–21, and Figure 4.6–22) has limited effect on hydrology in the bypass reach compared to the No Project. Therefore, it is expected that summer/fall water quality conditions would be the same as natural conditions discussed in Impact 4.6–1. That is, during the summer/fall low flow period water quality for aquatic species would not be affected by the Proposed Project. During the cooler winter/spring period, the Proposed Project reduces flows in the bypass reach by as much 105 cfs; however, because there are limited issues with water quality in the Proposed Project area and some parameters like dissolved oxygen concentrations benefit from cooler water temperature, general water quality is not expected to be affected in the bypass reach. Also, because flows below the powerhouse tailrace would be similar to natural conditions (all flow is back in the river), water quality is not expected to be affected in the below powerhouse reach.

Under natural conditions, a single dissolved oxygen measurement was reported to be as low as 6.3 mg/L in the bypass reach near the Proposed Project powerhouse site during the summer low flow period (4 to 5 cfs or less) (Tetra Tech, 2015a). Other measurements, however, indicated dissolved oxygen in suitable ranges (greater than 7 mg/l) (see Impact 4.6–1). Groundwater inflows to the stream could potentially be under–saturated with oxygen (this was not investigated) and there could be interactions in local areas of groundwater inflow with low stream flow and dissolved oxygen. However, small, steep gradient streams such as South Fork Battle

Creek rapidly aerate the water and because the Proposed Project would have a small, shallow diversion pool that would be operated in run–of–river mode, water would be quickly routed through it and would not thermally stratify or form anoxic conditions near its bottom. Therefore, releases from the diversion dam are expected to have the same dissolved oxygen levels as under existing conditions. Further downstream at Angel Falls, water would likely continue to be aerated to near saturation. Empirical measurements at 13 cfs in the bypass reach (minimum flow requirement for the Proposed Project) indicated suitable dissolved oxygen in the reach (Impact 4.6–1). As a result, the Proposed Project would have minimal effects, if any, on dissolved oxygen.

Overall, water quality related to aquatic species habitat in the bypass and below powerhouse tailrace reaches is not expected to be significantly different than natural conditions. Therefore, the impact is less than significant.

Water Temperature

Reduced streamflow in the bypass reach under the Proposed Project and Alternative 1 could alter the temperature regime by reducing the mass of water that is acted upon by solar warming or cooling due to shading in the bypass reach. Water diverted through the 2.4–mile–long pipeline and penstock would not experience solar warming and would be influenced by the soil temperature adjacent to the underground pipeline/penstock.

Water temperature empirical monitoring data (Impact 4.6–1) and modeling by Rugraw (Watercourse 2015) has shown that South Fork Battle Creek currently experiences low flows and warm water temperatures during the summer/fall months of drier years, but that there is some natural cooling of flow in the bypass reach as it passes downstream through the narrow canyon–like, heavily shaded channel. Flow input from Spring Number 4 near the bottom of the bypass reach augments flow and provides a source of cool water. Water temperature modeling and review of the empirical temperature data strongly suggest that with the Proposed Project operating, cooling would be maintained in the bypass reach, and water passing through the pipeline/penstock would experience cooling during the summer months as a result of being buried and shielded from solar radiation.

Empirical data (2004–2006, 2013–2019) show natural warm water temperatures exceed temperature thresholds for salmonid rearing (e.g., daily average 20°C recommended by CDFW) in the upper end of the bypass reach during the summer months, depending on water year type (drier years 2014, 2015, 2018) (Figure 4.6–23). To address potential effects of warming of water in the bypass reach, Rugraw proposed and resource agencies recommend shutting down the Proposed Project when specific water temperature criteria designated for the protection of coldwater fisheries habitat are exceeded. Rugraw and CDFW identified a criterion of a daily average temperature of 20°C for the protection of aquatic species. The State Water Board initially recommended a 7–day average daily maximum (7DADM) of 20ºC (FERC 2018). NMFS initially identified 7DADM targets of 18°C for June 1 to October 31, 13°C for November 1 to March 1, and 16°C for March 2 to May 31. However, based on additional consultation, NMFS concurred with FERC that the Proposed Project, with a 20ºC daily average criterion, “may affect but is not likely to adversely affect” Central Valley spring–run Chinook salmon and California Central Valley steelhead and their designated critical habitats. However, NMFS did require (NMFS 2019) fish monitoring to identify if ESA species are able to access the bypass reach and, if observed, that Rugraw develop a Biological Assessment and initiate informal consultation.

Irrespective of the summer temperature threshold used (20°C average daily or 7DADM), all of the measured high temperatures occurred when flows are less than 18 cfs. When flows are less than 18 cfs, the Proposed Project would not be diverting flow and would not affect water temperature in any way (Figure 4.6–8).

It is unlikely the Proposed Project would have any negative effect on water temperature within the bypass reach or downstream of the powerhouse in any circumstance. To protect against any uncertainty, however, FERC identified the need for temperature monitoring with real–time temperature monitors placed at the diversion and downstream in the creek above the powerhouse/above Spring Number 4 (this was included in Rugraw's Water Temperature Monitoring Plan). An additional requirement of the Water Temperature Monitoring Plan is if water temperature exceeds 20°C daily average at the diversion and the temperature upstream of Spring Number 4 is greater than the temperature at the diversion, operations will be halted.

Given the empirical water temperature data and modeling data that show water temperatures in the bypass reach and power penstock would cool and the requirement to shut down diversions under high temperatures (20°C) if they are project–induced, the Proposed Project would not have an impact on water temperature, and compliance with Applicant–proposed measures would further reduce impacts. Impacts would be less than significant.

Aquatic Habitat

The proposed run–of–river operation would affect the seasonal instream flow pattern in the 2.4–mile–long reach of South Fork Battle Creek between the proposed diversion dam (RM 23.0) and powerhouse tailrace (RM 20.6) (bypass reach). However, all flow would be returned to the stream 1.7 miles upstream of Panther Grade (RM 18.9) (see Figure 4.6–2), and the flow pattern would remain unaffected downstream of the Proposed Project tailrace. Modification of instream flows in the bypass reach would directly affect the capacity of that reach to support spawning, rearing, and other life stages of resident and possibly anadromous fish and other aquatic species (e.g., foothill yellow–legged frog), and may also affect other physical and biological processes. In diverted or bypass stream reaches that contain productive aquatic habitat, resource managers often establish instream flow regimes to maintain ecological functions, processes, and connectivity important for sustaining aquatic resources.

Rugraw proposes to maintain a minimum instream flow (MIF) of 13 cfs in the bypass reach (or natural flows, whichever is less), to sustain natural functions that support fish and provide habitat in the stream. The Proposed Project would not operate until flows reached 18 cfs (powerhouse needs a minimum of 5 cfs). A maximum of 105 cfs would be diverted. All diversions stop when stream flows at the diversion exceed 418 cfs. The MIF release and flows in excess of the diversion capacity would pass through low–level sediment pass–through gates on either side of the diversion dam or over the pneumatic gates in the center of the diversion dam.

Rugraw proposes to operate the Proposed Project in a run–of–river mode. To maintain run–of–river operation, Rugraw proposes a water surface elevation as close as possible to elevation 4,310 feet msl (top of the proposed 0.4–acre impoundment). Run–of–river operation would require Rugraw to release via the powerhouse and the diversion dam (i.e., the minimum flow plus excess flow) a total flow equal to the inflow to the Proposed Project impoundment on a near–instantaneous basis (inflow equals outflow; no storage).

A limited set of information is available for analyzing habitat versus flow relationships for rearing resident and potential anadromous salmonids (Figure 4.6–12 and Figure 4.6–14) and spawning for anadromous species (Figure 4.6–15). No specific modeling data are available for other species, such as foothill yellow–legged frog. Therefore, habitat versus flow relationships (e.g., a PHABSIM instream flow study) for resident and anadromous fish habitat (spawning, juvenile rearing, adult rearing, and adult holding) and foothill yellow–legged frog over a wide range of flows do not exist. Nevertheless, a large amount of data are available to address spawning and rearing habitat for aquatic species. Below, effects of Proposed Project flow modification on rearing and spawning habitat are addressed for resident fish, special–status amphibians, and special–status fish aquatic habitat.

Resident Fish. Spawning habitat versus flow was not modeled for resident rainbow trout; however, the spawning habitat versus flow relationship for steelhead (larger fish that spawn in faster water) gives an indication that habitat for spawning resident rainbow trout likely increases with flow up through approximately 30 cfs (Figure 4.6–15). Resident rainbow trout spawn during spring (e.g., March – May) high flows; spawning is typically initiated as flows start to decline. Figure 4.6–19, Figure 4.6–21, and Figure 4.6–22 indicate that the Proposed Project flows in the bypass reach in the spring would typically be reduced to 13 cfs and, therefore, the Proposed Project would reduce the amount of spawning habitat in that reach during most years. Spawning habitat would still be available (see e.g., Figure 4.6–15) in the bypass reach, but less than would be available under the No Project Alternative (e.g., 50 steelhead redds at 13 cfs versus 110 steelhead redds at approximately 30 cfs). Downstream of the proposed powerhouse all natural flow would be in the river and spawning habitat would not be affected by the Proposed Project.

Rearing habitat is the limiting factor for resident rainbow trout in the bypass reach (Figure 4.6–13) due to extremely low or a complete lack of flow during late summer and fall, when the Proposed Project is not diverting (flows less than 18 cfs) (Figure 4.6–6, Figure 4.6–19, Figure 4.6–20, Figure 4.6–21, and Figure 4.6–22). Particularly during drought years, when much of the bypass reach dewaters naturally, the resident fish population is extirpated (some fish may be able to move downstream past upstream fish passage barriers to where flows exist). Downstream of the powerhouse, the Proposed Project would not affect rearing habitat as all diverted water is returned to the stream.

Rugraw's proposed ramping rate of one inch or less per hour would prevent flow fluctuations in the bypass reach that could strand fish (e.g., fry, juveniles). A decline of one inch or less in flow per hour has been shown to protect against stranding (Hunter 1992). When flows at the diversion dam exceed the diversion capacity, flow fluctuations in the bypass reach would be a result of natural flow events bypassing the diversion. Downstream of the powerhouse/bypass reach, natural stream flows would prevail. Infrequently, for a short amount of time at startup or shutdown, if travel time of flows in the penstock is faster than travel time of flows in the stream, there could be a small fluctuation in flow (note: if travel time of the two were perfectly synched, no change in flow would occur downstream of the powerhouse at startup and shutdown).

Overall, due to the annual natural low flows and periodic dewatering in the bypass reach, the habitat carrying capacity of the reach for resident fish is limited by natural conditions that occur when the Proposed Project would not be operating. The Proposed Project also includes measures to control for potential down ramping events that could strand fish. Therefore, the Proposed Project would not affect habitat carrying capacity for resident fish.

Operation and Maintenance Impacts – Physical Environment (Fish Passage Barriers, Hydrology, Water Quality, Water Temperature, Aquatic Habitat)

- **Level of Significance:** Less Than Significant Impact
- **Mitigation Measures:** None required

Special–Status Amphibians and Aquatic Reptiles

Foothill yellow–legged frog, Cascades frog, California red–legged frog, and Western pond turtle are species that use slow water habitats, which are maximized at lower flows. Foothill yellow–legged frog are the species most likely to be present in the Proposed Project area/bypass reach. Foothill yellow–legged frog use spawning velocities typically less than 0.5 foot/second (maximum less than 1.0 foot/second) and relatively shallow depths of typically less than 1.5 feet (maximum of less than 3.0 feet) and a large percentage are found as shallow as 4 inches (10 cm) (PCWA 2010). Tadpoles are found in low velocity, relatively shallow water very similar to the egg masses (PCWA 2010). The Proposed Project bypass flows (Figure 4.6–19, Figure 4.6–20, Figure 4.6–21, and Figure 4.6–22) would provide good base flow conditions for foothill yellow–legged frog, Cascades frog, California red–legged frog, and Western pond turtle aquatic habitat.

Foothill yellow–legged frog spawning typically occurs after water temperature exceeds 12°C (54°F), which occurs mid–May to early June (Figure 4.6–9) in the bypass reach. Egg masses and very young tadpoles are susceptible to dewatering and scour. Flow fluctuations in the spawning/early rearing season can affect both life stages. The Proposed Project includes a measure, Special–Status Amphibian Protection Plan, that must be developed in coordination with agencies and that would protect foothill yellow–legged frog egg masses and tadpoles:

> *To protect FYLF [foothill yellow–legged frog] from spring base flow recession rates that could dewater egg masses the plan should include: (1) a protocol for distinguishing base flow recessions from storm pulse recessions; (2) measures to avoid a greater than 1–foot reduction in base flow over a 3–week period; and (3) annual reporting that provides the stage record from May 1 through July 31, and identifies periods where operations were modified, if necessary, to protect FYLF egg masses, or demonstrates that base flow stage reductions did not exceed the 1 foot per 3–week threshold.*

Overall, the Proposed Project would not affect foothill yellow–legged frog, Cascades frog, California red–legged frog, and western pond turtle aquatic habitat, except for foothill yellow–legged frog breeding habitat. The Proposed Project includes a Special–Status Amphibian Protection Plan that details a maximum down ramp limitation of one–foot stage reduction in base flow over a three–week period (May 1 through July 31) is designed to protect egg masses and early tadpoles from dewatering (Yarnell et al. 2016). However, there are two issues with the plan. One is related to the stage monitoring location and the other is related to the down ramping rate.

The stage monitoring location must be either in a channel section representative of breeding locations (typically wider depositional channel sections) or in a conservative location (narrower channel section) that experiences as much or more stage change as the locations where breeding would occur. If the stage monitoring location is in an overly–wide channel section (limited stage change with flow) it will not protect egg masses and early tadpoles, which would be a significant impact. Implementation of Recommended Measure AQU–2 would ensure that stage monitoring occurs in either a section representative of breeding locations or a narrow

channel section, which would make the impact less than significant with mitigation. However, Rugraw has not approved of this measure, so the impact would be significant and unavoidable.

If foothill yellow–legged frogs are present in the bypass reach and downstream of the immediate vicinity of the powerhouse tailrace, a down ramping rate that protects egg masses and early tadpoles from dewatering is required. The cool temperature regime in the bypass reach, however, does not appear to be optimal for foothill yellow–legged frog breeding/survival. Based on the 2015 through 2019 water temperature data (Figure 4.6–27) the mean 30–day average temperature (M30DAT) at the warmest site, ABS, is 20.8°C, 17.8°C, 16.8°C, 18.8°C, and 16.1°C M30DAT for 2015, 2016, 2017, 2018, and 2019, respectively. A 17.6°C M30DAT was found to be necessary for a foothill yellow–legged frog population to be present (Kupferberg et al. 2011). The upstream ABS site appears to be suitable only in the drier years. The cooler downstream portions of the bypass reach would be less suitable. If foothill yellow–legged frogs are present; however, breeding would occur after sustained 12°C or greater water temperatures have occurred. For the ABS site this would occur typically in late May through early July, Figure 4.6–27, and possibly in early May of extreme drought years (e.g., 2015). At 12°C, it can take up to 20 days for a foothill yellow–legged frog egg mass to hatch (Kupferberg et al. 2011).

Assuming foothill yellow–legged frog breeding is occurring, down ramp rates would need to be slow enough in May through July to protect egg masses and early tadpoles (if a generic all water year type approach is used). As a large portion of the egg masses could be as shallow as 10 cm (4 inches) (Figure 4.6–29) and, because at 12°C it can take up to 20 days to hatch, Rugraw's proposed down ramping rate of 1 foot/3 weeks would not be protective. Therefore, the Proposed Project's impacts to foothill yellow–legged frog breeding habitat with regards to down ramping would be significant and unavoidable.

Operation and Maintenance Impacts – Physical Environment (Special–status Amphibians and Aquatic Reptiles)

- **Level of Significance Regarding Stage Monitoring Location:** Significant and Unavoidable
- **Recommended Measure AQU–2: Stage Recording.** Proposed Project compliance stage monitoring/recording by Rugraw downstream of the diversion dam from May 1 through July 31 would either be located in a cross–section that represents the depositional areas where foothill yellow–legged frog deposit egg masses or in a narrower cross–section (more sensitive to flow changes) that would be protective of stage changes in foothill yellow–legged frog breeding habitat. The stage monitoring location would be approved by agencies responsible for foothill yellow–legged frog management (e.g., CDFW, USFWS).
- **Level of Significance Regarding Down–Ramping Rate:** Significant and Unavoidable

Special–Status Fish Species

Chinook salmon and steelhead are not present in the Proposed Project bypass reach. They would only enter the bypass reach if they successfully pass the downstream diversion dams (Coleman, Inskip, and South Diversion), which are slated for removal or construction of passage structures, and navigate through natural barriers at Panther Grade (RM 18.9) and Powerhouse Falls near the powerhouse tailrace (RM 20.6). Although unoccupied, the bypass reach includes

designated Critical Habitat for steelhead up to Angel Falls (RM 22.3) and spring–run Chinook salmon up to RM 21.4. Historical presence of either of these species below Angel Falls is not known, because the designation was made after downstream barriers to anadromous fish passage had been in place for many years.

The Proposed Project includes an Anadromous Fish Monitoring Plan that requires Rugraw to monitor for anadromous fish once they potentially have access to the bypass reach (i.e., when the downstream dams are removed and/or fish passage structures are constructed). The Anadromous Fish Monitoring Plan has a flow trigger, a 2.5–year return interval flow event (November 1 through May 31), which will trigger snorkeling in the bypass reach below Angel Falls to identify if anadromous fish have successfully navigated upstream over natural barriers. If anadromous fish are observed, Rugraw will release a 30 cfs pulse for 48 hours every four weeks (November 1 through May 31), and prepare a Biological Assessment and informally consult with NMFS to determine (1) if the Proposed Project operations are adversely affecting anadromous salmonid(s), (2) what actions Rugraw will take to mitigate for the Proposed Project's adverse effects, if adverse affects have been determined and (3) if opening the License is necessary.

If anadromous fish were present, the Proposed Project would not affect their habitat downstream of the powerhouse. This is because all natural flow returns back to the river below the powerhouse. Within the bypass reach, the Proposed Project would not affect spring–run Chinook salmon adult holding, spawning, or stream–type juvenile habitat. During the adult holding and spawning season, the bypass reach natural water temperature would typically preclude holding as it would be too warm (Figure 4.6–9). Further, the Proposed Project would not be operating during the naturally low flow, September spawning season (Figure 4.6–19, Figure 4.6–20, Figure 4.6–21, and Figure 4.6–22). For stream–type Chinook salmon juveniles residing in the bypass reach, habitat carrying capacity would be severely limited by natural low, summer/fall flows (Figure 4.6–12, Figure 4.6–13, Figure 4.6–19, Figure 4.6–20, Figure 4.6–21, and Figure 4.6–22) and high water temperatures (Figure 4.6–10). The Proposed Project could affect spring rearing habitat for both stream–type and ocean–type Chinook salmon fry. Due to reduced flows in the bypass reach, spring rearing habitat could be reduced if the number of juveniles present exceeded the habitat carrying capacity available at the lower flows (Figure 4.6–13, Figure 4.6–14, Figure 4.6–19, Figure 4.6–20, Figure 4.6–21, and Figure 4.6–22). To evaluate this situation, an additional instream flow study that (1) covers the full range of hydrology, (2) addresses habitat related to fish density/carrying capacity, and (3) uses accurate fry rearing habitat suitability criteria (including cover) would be needed to assess potential spring rearing habitat impacts for ocean–type fry.

Steelhead spawning habitat within the bypass reach could also be impacted by the Proposed Project hydrology in late winter/spring if they were present (Figure 4.6–15, Figure 4.6–19, Figure 4.6–20, Figure 4.6–21, and Figure 4.6–22). In addition, spring rearing habitat for steelhead fry could also be affected by the Proposed Project if they were present (Figure 4.6–12), but only for fry that move downstream out of the bypass reach at the end of their first spring. Over–summering rearing habitat/carrying capacity of fry/juveniles would not be affected by the Project as rearing capacity would be severely limited by natural low summer/fall flows (Figure 4.6–19, Figure 4.6–20, Figure 4.6–21, and Figure 4.6–22) and high water temperatures (Figure 4.6–10) unrelated to Proposed Project operations. To address potential impacts to spring spawning and fry rearing habitat, an additional instream flow study that (1) covers the full

range of hydrology, (2) addresses habitat related to fish density/carrying capacity, and (3) uses accurate fry rearing habitat suitability criteria would be needed.

Overall, the Proposed Project would not affect spring–run Chinook salmon and steelhead Critical Habitat with incorporation of the Anadromous Fish Monitoring Plan that would ensure monitoring for anadromous fish entering the Proposed Project bypass reach and implementation of protective measures (e.g., pulse flows) if they were determined to be present in the bypass reach. However, without an accurate means to assess the instream flow habitat needs of spring–run Chinook salmon and steelhead, once they have entered the bypass reach, the Anadromous Fish Monitoring Plan falls short in providing the information needed to identify (1) if operations are adversely affecting the species and (2) what Rugraw will do related to instream flows to mitigate for the Proposed Project's adverse effects. An instream flow study that accurately assessed the habitat needs of anadromous fish over the full range of affected hydrology was not conducted for the Proposed Project (data were collected only in a few habitat units and only up to 30 to 40 cfs, Figure 4.6–12).

To ensure that the Anadromous Fish Monitoring Plan and protective measures accurately assess and respond to Proposed Project–induced impacts to anadromous fish if they are able access the bypass reach, the plan needs to include Recommended Measure AQU–3, an instream flow study (in the event fish are observed) that (1) covers the full range of hydrology, (2) addresses habitat related to fish density/carrying capacity, and (3) uses accurate fry/juvenile rearing and adult spawning habitat suitability criteria to fully protect anadromous fish. With AQU–3, the impact would be less than significant with mitigation. However, Rugraw has not approved of this measure, so the impact would be significant and unavoidable.

Operation and Maintenance Impacts – Physical Environment (Special–status Fish Species)

- **Level of Significance:** Significant and Unavoidable
- **Recommended Measure AQU–3: Anadromous Fish Monitoring Plan – Instream Flow Study.** The Anadromous Fish Monitoring Plan would include an additional instream flow study in the event fish are observed in the bypass reach that (1) covers the full range of hydrology, (2) addresses habitat related to fish density/carrying capacity, (3) uses accurate fry/juvenile rearing and adult spawning habitat suitability criteria. After the study is completed, Rugraw would consult with the agencies (CDFW, NMFS, USFWS, State Water Board) to determine whether revisions to the minimum instream flow are necessary.

Sediment and Large Woody Debris Transport

Proposed Project operations at the diversion dam may alter substrate, large woody debris, and turbidity in the bypass reach, which could affect aquatic habitat. Gravels and woody debris trapped behind the diversion dam could reduce their availability in downstream habitats. Excess turbidity releases from the dam could negatively affect downstream species. The Proposed Project includes a Debris and Sediment Management Plan (DSMP) that includes:

- Annual sluicing of sediments from the Proposed Project's reservoir when natural flow at the diversion site exceeds 418 cfs or in years where natural flows never reach 418 cfs,

the sediment deposits in the reservoir would be evaluated to determine if sluicing is needed;

- Consultation with the State Water Board and CDFW to determine if the sluicing of sediments should occur when flows are less than 418 cfs;
- Monitoring of turbidity associated with sluicing events to document any project–caused exceedance of the Central Valley Regional Water Quality Control Board Basin Plan's turbidity objectives;
- Periodic surveys of the Proposed Project impoundment to document sediment and woody material deposition; and
- Process to modify the DSMP as needed.

Chapter 2, Proposed Project Description also includes a description of sediment and sluicing management, woody debris management, and turbidity and pH monitoring (Sections 2.3.4 and 2.3.5.

The proposed diversion impoundment is considered very small, at 50 feet wide by 320 feet long (channel slope 2.5 percent and 8–foot tall diversion dam gates) (NWH 2015). Under the conservative assumption that all bedload sediment is trapped in the diversion impoundment, NWH (2015) estimated that on average approximately 50 percent of the approximately 0.34 acre diversion pool could be filled with sand and gravel (mostly gravel) each year. Even in the extreme case that most of the diversion impoundment fills with sediment and the Proposed Project operates at stasis such that only open water in the vicinity of diversion gates is maintained, the amount of sediment stored long–term (i.e., one time filling of the pool) would have an imperceptible change on downstream habitats.

In general, the Proposed Project operations would nearly continuously bypass fine sediments such as silt or sand that make it through the diversion impoundment whereas coarser sediment would drop out first in the upstream portion of diversion pool. A portion of the 13 cfs minimum flows would pass through the low level sediment pass–through gates on either side of the diversion dam and any excess flows above the powerhouse capacity of 105 cfs, up to 300 cfs, would pass through the sediment gates along with suspended or mobilized fine sediments. When flows reach 418 cfs, the pneumatic gates in the center of the structure will lower completely. Under these operations, any remaining sediment deposited upstream in the impoundment would be mobilized and transported downstream. This would not occur every year (i.e., approximately 40 of 92 years as demonstrated in Table 4.6–6), and in years when it does occur the number of days of high flow would be, on average, 3.1 days, (Table 4.6–6).

The same transport capacity that moves sediment from the diversion impoundment would occur downstream of the diversion. Based on sediment transport study estimates for the channel near the diversion dam (NWH 2015), sand can be mobilized at a few cfs and very fine gravel, fine gravel, and medium gravel at flows of 10 cfs, 20 cfs, and 80 cfs, respectively. Coarser gravels would require flows greater than 418 cfs (600 cfs) (NWH 2015). Downstream of Angel Falls, the transport capacity is much greater due to the steeper gradient (NWH 22015). Overall, the sediment would move through the system semi–naturally and provide habitat in a natural manner.

In the case that the diversion dam pneumatic gates needed to be lowered below approximately half height to clear part of the diversion from sediment at flows lower than 418 cfs (i.e., to keep gates at the diversion operational) or maintain low levels of fine sediment in the diversion dam concerns could arise with turbidity and ramping rates. If enough fine sediment was deposited upstream in the diversion impoundment there could be a turbidity spike downstream. Turbidity should; therefore, be monitored to ensure that water quality complies with the Basin Plan. Currently, the proposed DSMP does not include turbidity monitoring/reporting outside of sluicing events. Similarly, the FERC staff–recommended Turbidity and pH Monitoring Plan only mentions observation of turbidity plumes during construction.

Similar to sediment, small and large woody debris would be transported downstream via diversion dam operations. Woody debris would move downstream when the center gates are lowered or flows are high enough to go over the top of the diversion dam pneumatic gates. The Proposed Project may need to periodically lower the gates partially to manage woody debris that builds up behind the gates, particularly if a large tree or large amount of debris enters the diversion during typical diversion operations. The current proposed up–ramping rates may hinder management of woody debris.

Overall, the temporary storage of woody debris at the diversion pool would have no discernable effect on downstream habitat. Even if some large wood needs to be cut to bypass the diversion, downstream habitats in this channel (e.g., bypass reach) are not based on the influence of large woody debris. Cramer et al. (2015) found a near total absence of large woody debris influencing habitat (e.g., pools) in this large boulder formed stream.

Turbidity, as discussed above, should be monitored when potential large releases of sediment at flows lower than 418 cfs are released (for example, when the pneumatic gates are lowered more than halfway down) to ensure compliance with Basin Plan requirements. Ideally, the Proposed Project would maintain fine sediment behind the diversion dam gates at low levels. However, any large releases of sediment from the pneumatic gates could release fine sediment and violate the Basin Plan, which would be a potentially significant impact. Recommended Measure AQU–4 would require Rugraw to modify the DSMP to include turbidity monitoring and reporting requirements with remedial actions if the Proposed Project causes turbidity to exceed Basin Plan water quality objectives. Implementation of AQU–4 would make the impact less than significant with mitigation. However, Rugraw has not approved of this measure, so the impact would be significant and unavoidable.

Operation and Maintenance Impacts – Physical Environment (Sediment and Large Woody Debris Transport)

- **Level of Significance:** Significant and Unavoidable
- **Recommended Measure AQU–4: Debris and Sediment Management Plan Modifications.** Modification of the DSMP is required to include explicit compliance with Basin Plan turbidity standards and monitoring/reporting of turbidity when the pneumatic gates are lowered below half elevation and flows are less than 418 cfs.

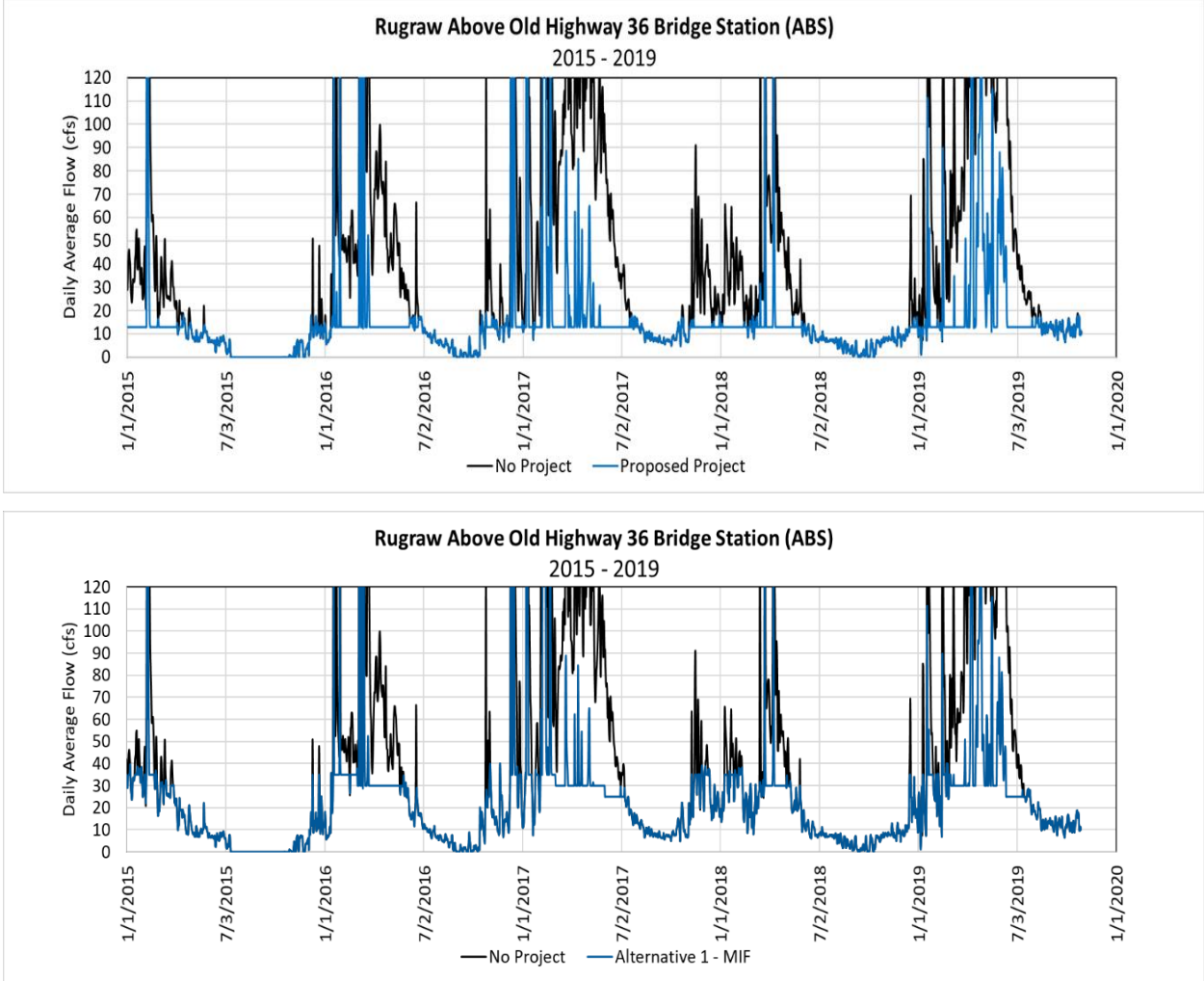

Figure 4.6–19. 2015–2019 Empirical Hydrology Time Series for No Project and Proposed Project (Top) and for No Project and Alternative 1 (Bottom)

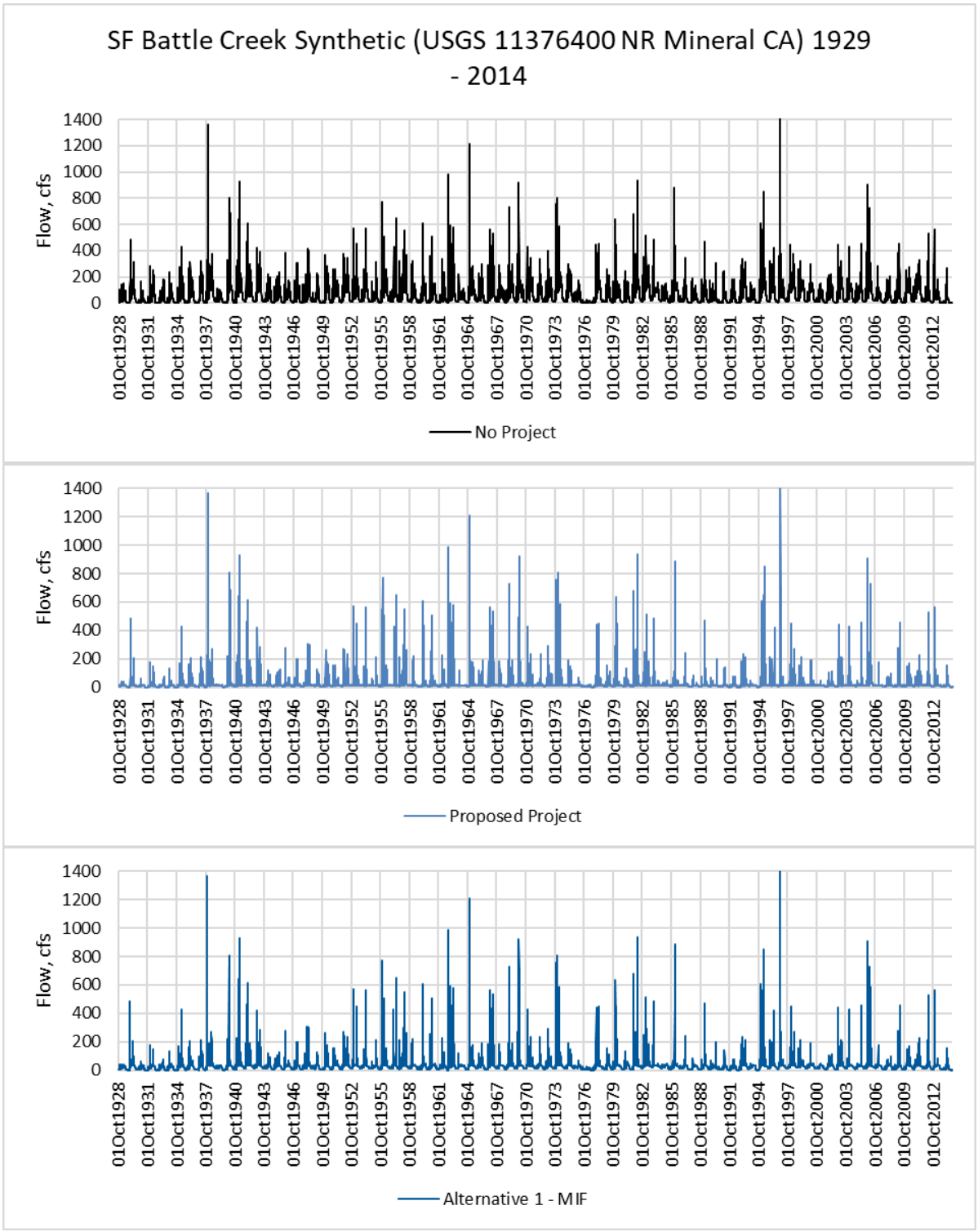

Figure 4.6–20. 1929–2014 Synthetic Hydrology Time Series for No Project (Top), Proposed Project (Middle), and Alternative 1 (Bottom)

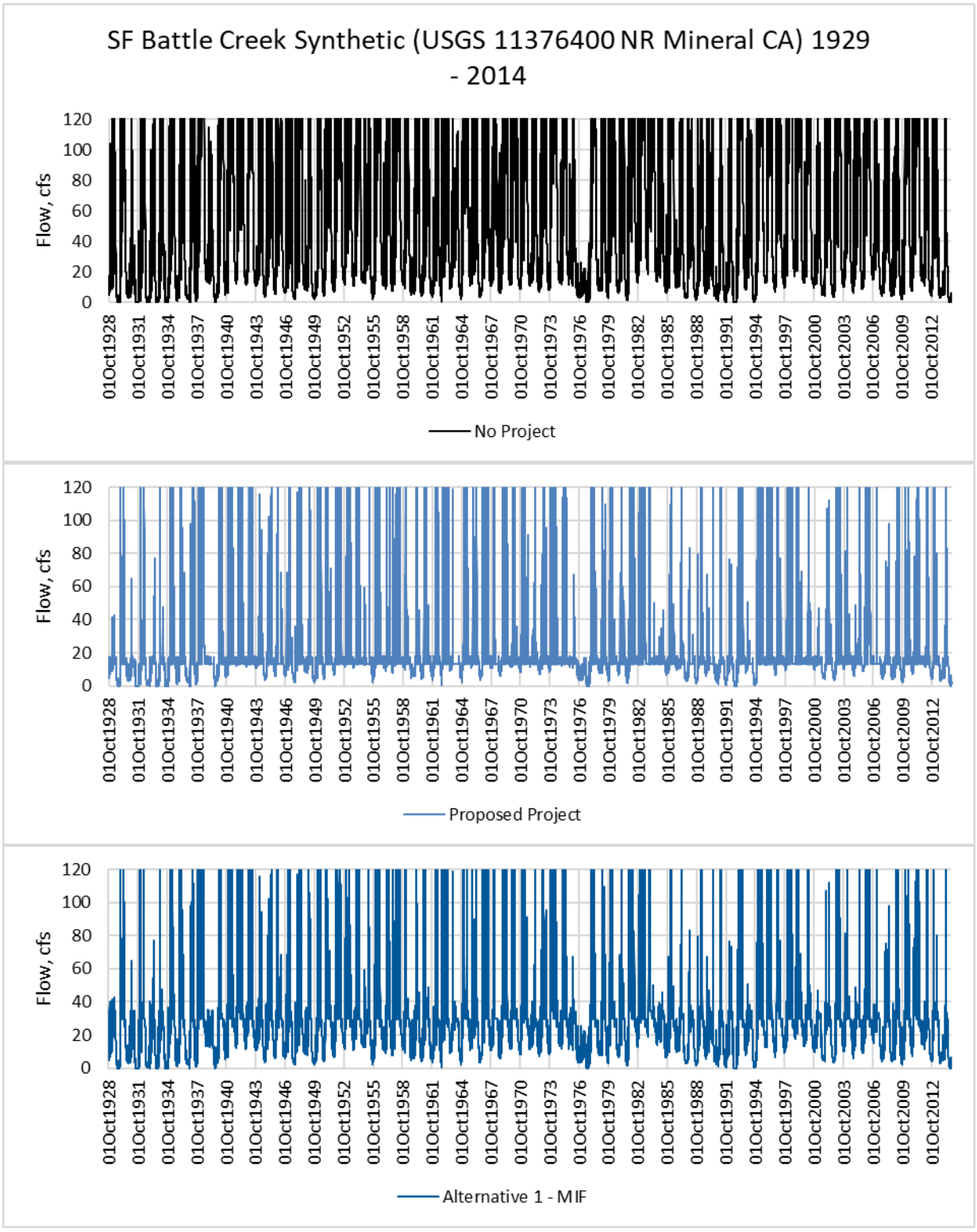

Figure 4.6–20. (continued) 1929–2014 Synthetic Hydrology Time Series for No Project (Top), Proposed Project (Middle), and Alternative 1 (Bottom)

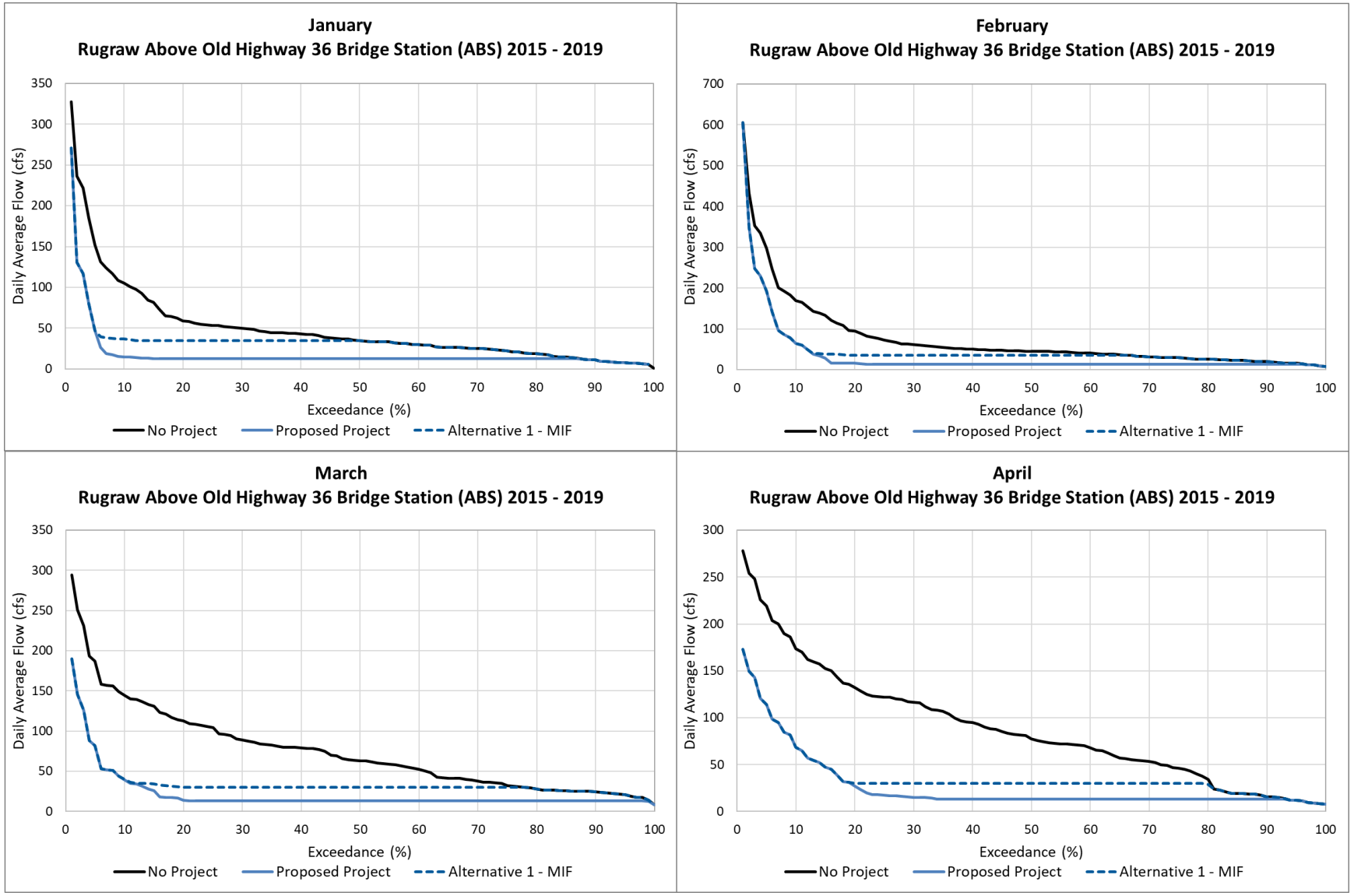

Figure 4.6–21. 2015–2019 Monthly Exceedance Plots Based on Empirical Data for No Project, Proposed Project, and Alternative 1.

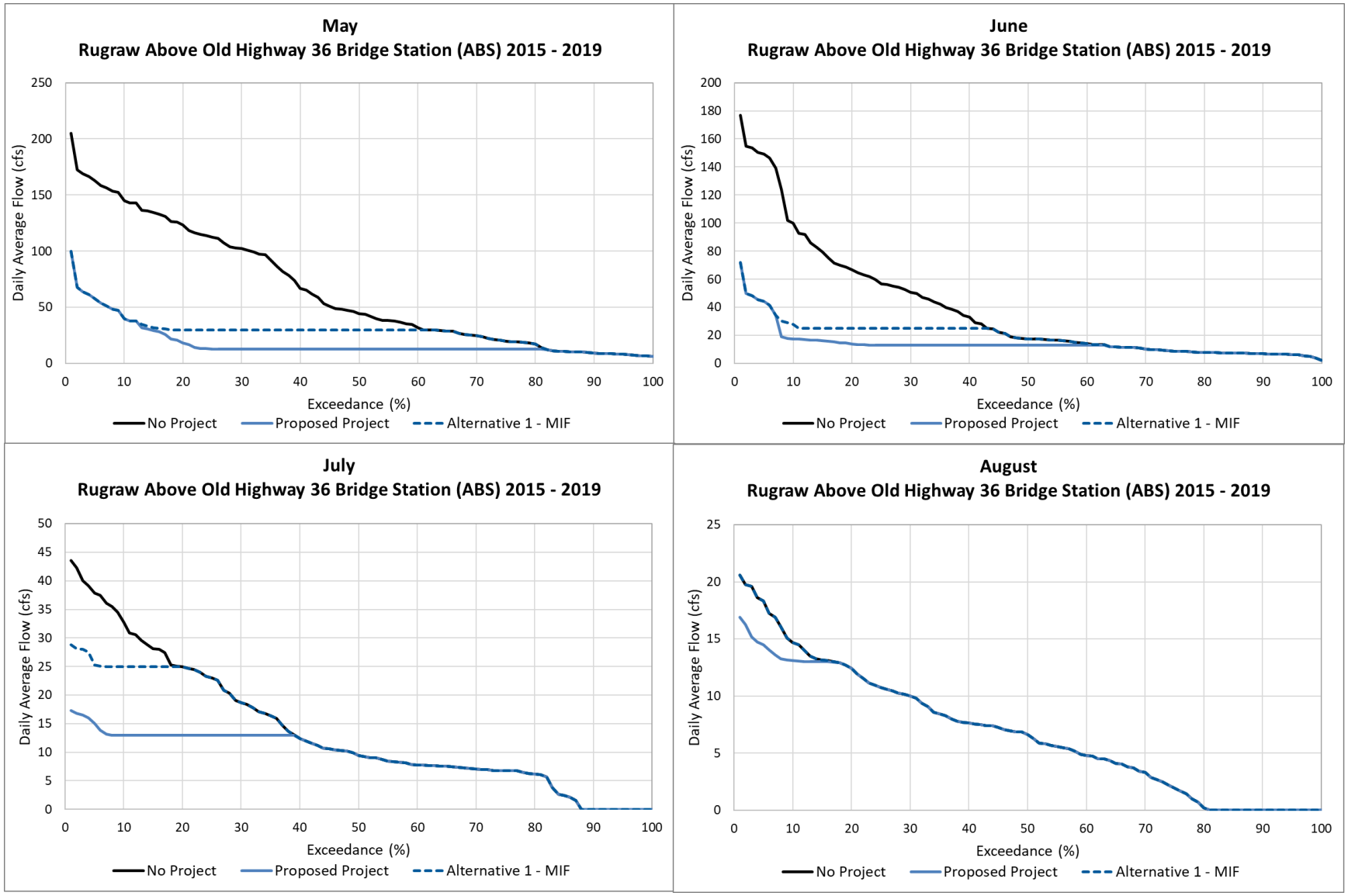

Figure 4.6–21. (continued) 2015–2019 Monthly Exceedance Plots Based on Empirical Data for No Project, Proposed Project, and Alternative 1.

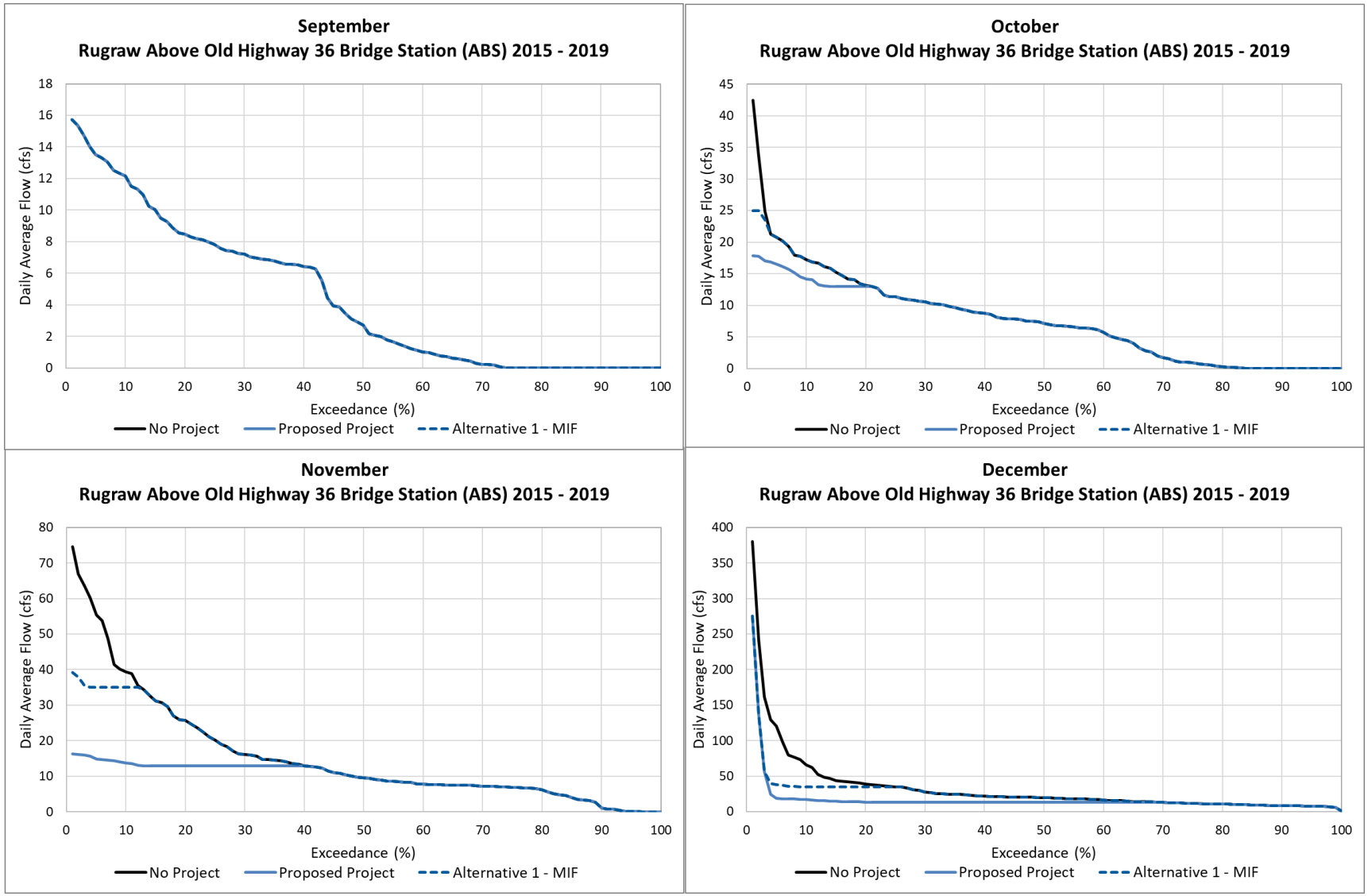

Figure 4.6–21. (continued) 2015–2019 Monthly Exceedance Plots Based on Empirical Data for No Project, Proposed Project, and Alternative 1.

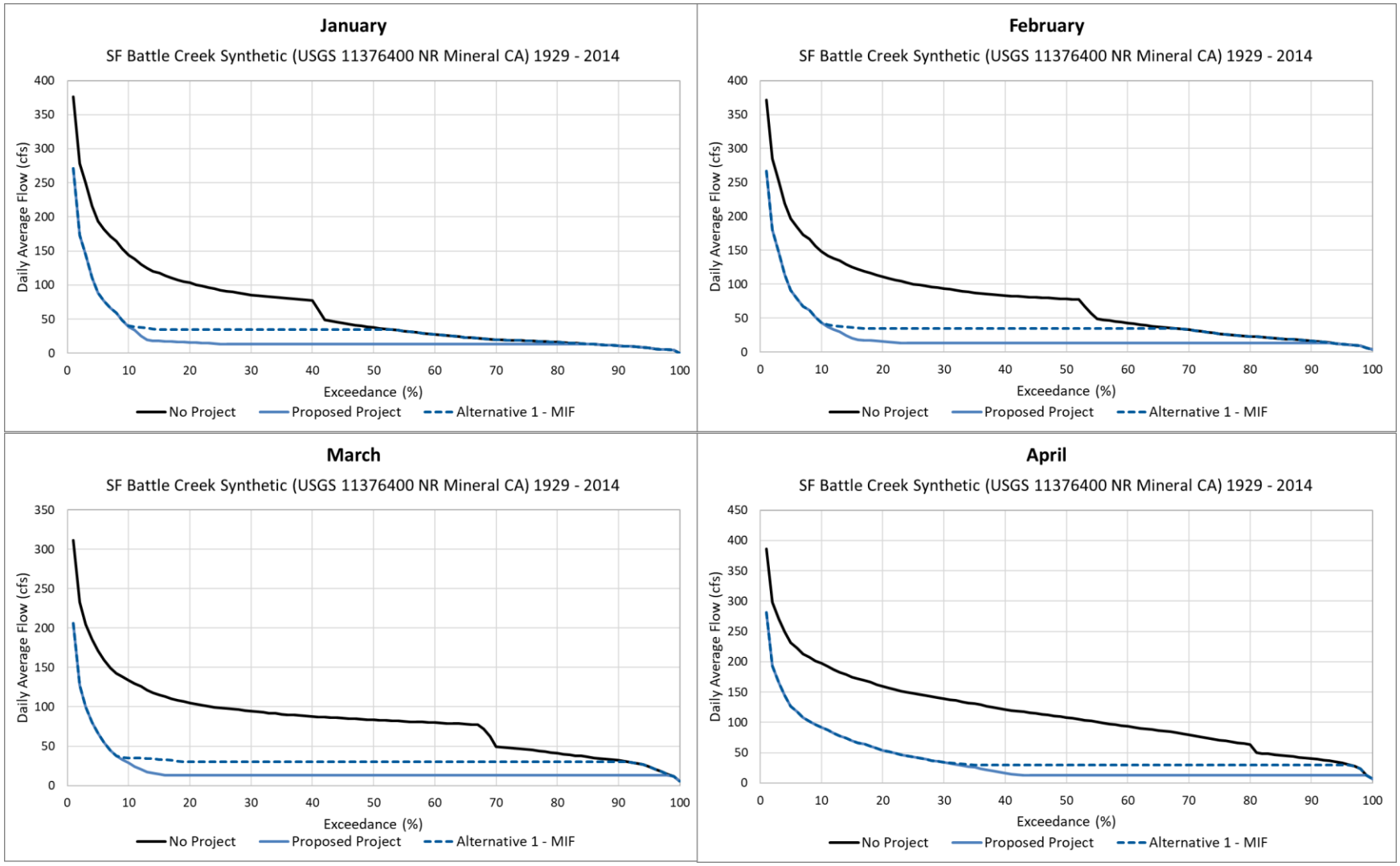

Figure 4.6–22. 1929–2014 Monthly Exceedance Plots Based on Synthetic Data for No Project, Proposed Project, and Alternative 1.

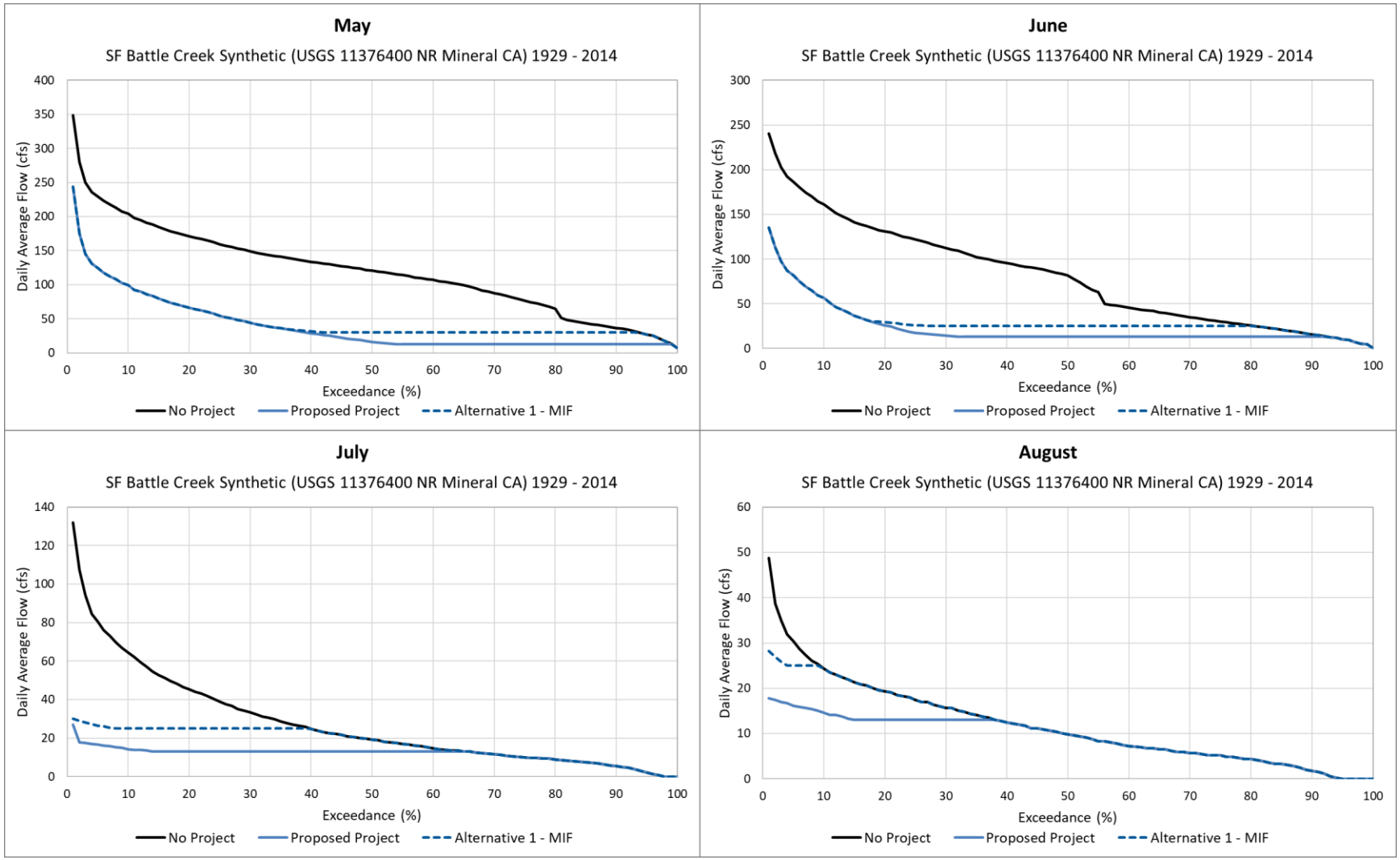

Figure 4.6–22. (continued) 1929–2014 Monthly Exceedance Plots Based on Synthetic Data for No Project, Proposed Project, and Alternative 1

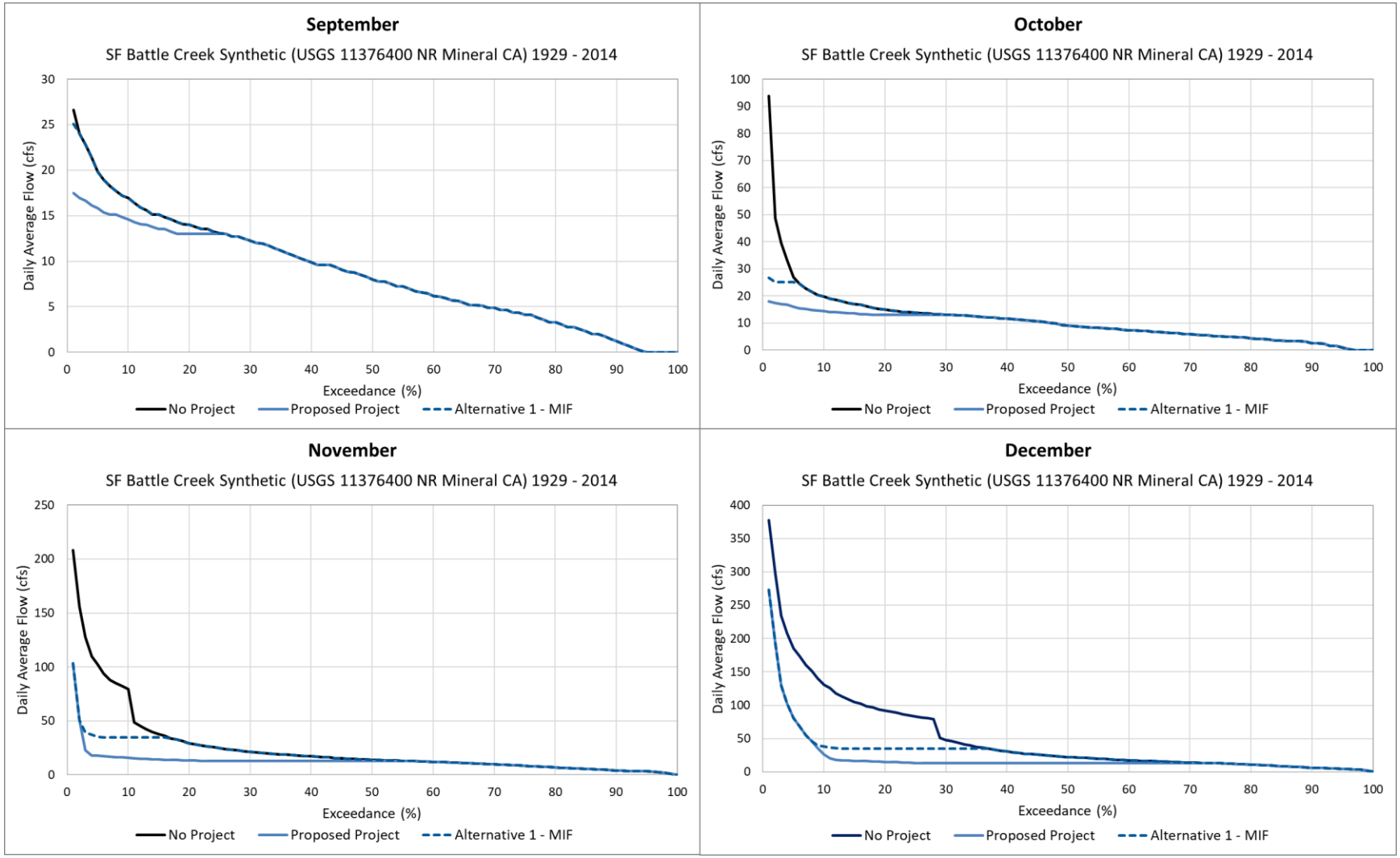

Figure 4.6–22. (continued) 1929–2014 Monthly Exceedance Plots Based on Synthetic Data for No Project, Proposed Project, and Alternative 1

Table 4.6–6. Flows Downstream of the Proposed Diversion Dam that Exceed 100 cfs, 200 cfs, 300 cfs, and 418 cfs (1926–2019).

Parameter	Flow Exceeded 100 cfs	Flow Exceeded 200 cfs	Flow Exceeded 300 cfs	Flow Exceeded 418 cfs
No Project				
Years with a flow event	90 of 92	80 of 92	61 of 92	40 of 92
Days Total	6775	1123	286	123
Average Days / Year (only years with flow)	75.3	14.0	4.7	3.1
Proposed Project				
Years with a flow event	79 of 92	60 of 92	41 of 92	40 of 92
Days Total	1039	272	132	123
Average Days / Year (only years with flow)	13.2	4.5	3.2	3.1
Alternative 1				
Years with a flow event	79 of 92	60 of 92	41 of 92	40 of 92
Days Total	1039	272	132	123
Average Days / Year (only years with flow)	13.2	4.5	3.2	3.1

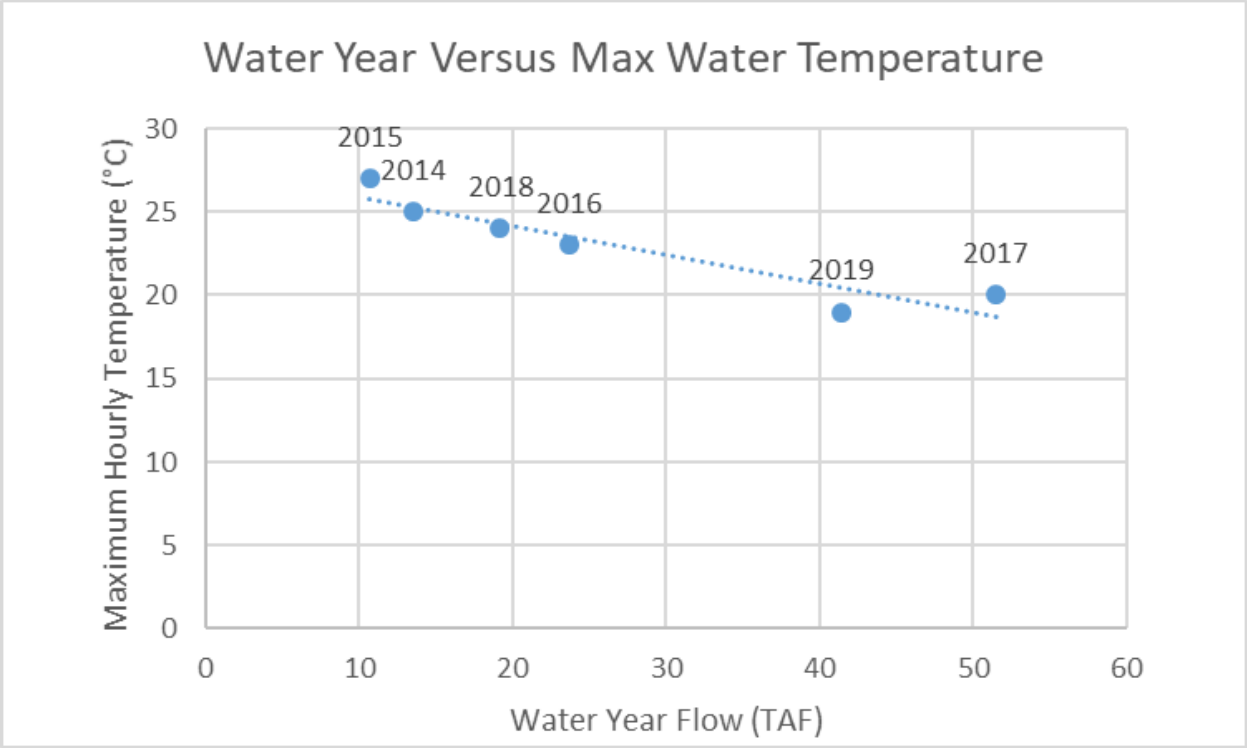

Figure 4.6–23. Maximum Hourly Water Temperature Versus Water Year Type at the ABS Site Downstream of the Proposed Diversion Dam (2014–2019).

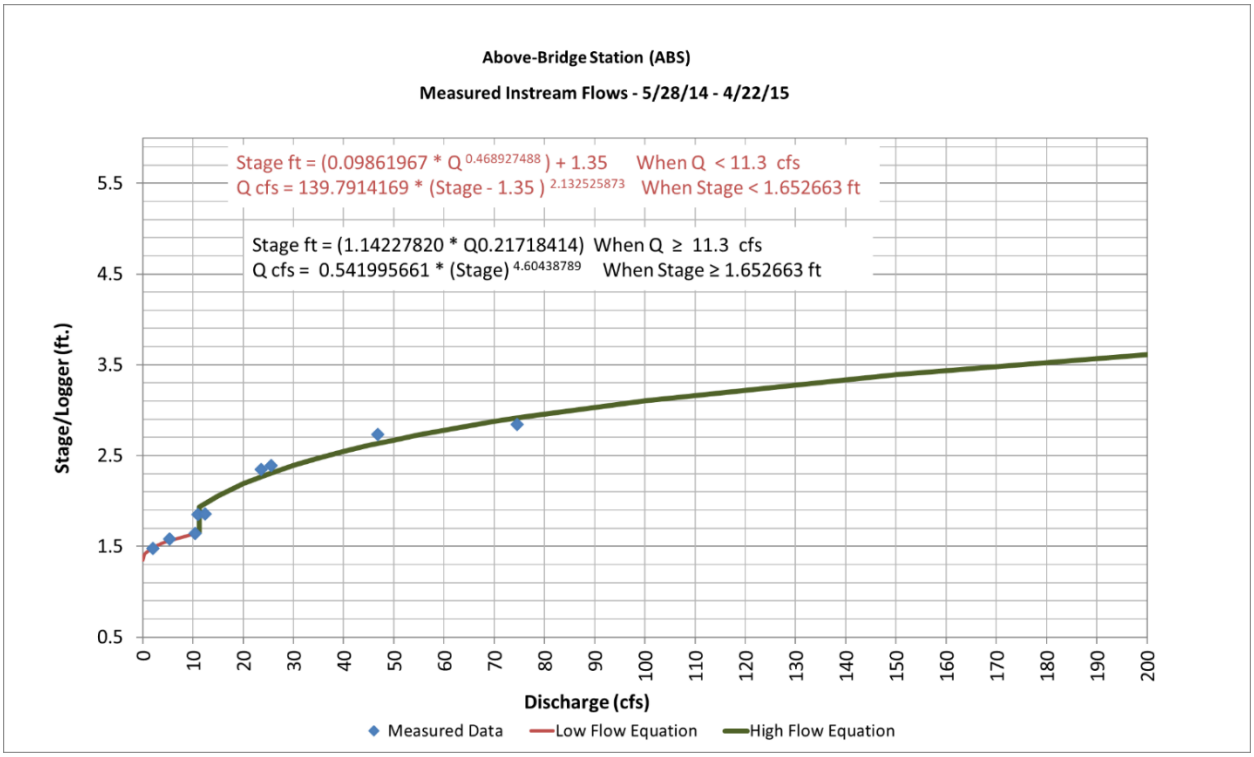

Figure 4.6–24. Approximate Rating Curve for the ABS Site (see Figure 4.6–2) Downstream of the Proposed Diversion Dam.

Biological

Resident Fish

Resident rainbow trout and riffle sculpin distribution, abundance, growth, and health downstream of the Proposed Project powerhouse would not be affected by the Proposed Project because aquatic habitat, including passage, hydrology, water quality, water temperature, physical rearing/spawning habitat, and sediment/large woody debris would not be modified from existing conditions (see previous Physical Environment section).

For resident rainbow trout and riffle sculpin within the Proposed Project bypass reach, fish passage, hydrology, and physical rearing/spawning habitat (see Section 4.6.2 Physical Environment) would be modified by the Proposed Project primarily via reduction of flows (up to 105 cfs diversion; 13 cfs minimum flow), which can reduce habitat and make movement and redistribution of fish in the reach more difficult. However, because the bypass reach naturally has extreme low flows, is sometimes naturally dewatered (dry years) during late summer/fall (Figure 4.6–19, Figure 4.6–20, Figure 4.6–21, Figure 4.6–22), and has water temperature greater than 20°C in dry years (Figure 4.6–9), the carrying capacity of the bypass reach is severely limited naturally, unrelated to Proposed Project operations (Figure 4.6–13). Similarly,

re–seeding of fish populations in the bypass reach following dewatering in dry years most likely occurs by fish moving downstream from populations present in the upper watershed during high flows. Impassable upstream passage barriers over a wide range of flows below or within the bypass reach (see Impact 4.6–2) would preclude upstream reseeding. This is important because under other circumstances, the lower flows in the bypass may make upstream reseeding more difficult. Overall, with the Applicant–proposed measures and other required monitoring plans, discussed in Impact 4.6–1and the natural limitation of summer/fall flows in the bypass reach, the Proposed Project operations would maintain resident fish distribution, abundance, growth, and health similar to No Project conditions.

Special–Status Amphibians and Aquatic Reptiles

Foothill yellow–legged frog, Cascades frog, California red–legged frog, and Western pond turtle are species that use slow water habitats which are maximized at lower flows in the bypass reach under the Proposed Project. Aquatic habitat for these species would be protected based on the proposed measures identified in Impacts 4.6.–1 and Impact 4.6–2, such as ramping rates to protect Proposed Project related flow fluctuation from occurring. Recommended Measure AQU–2 in particular limit Proposed Project related flow down ramps that could strand amphibian egg masses in the bypass reach to 4 inch/20 days during the May 1 to July 31 time period (i.e., during foothill yellow–legged frog egg mass and early tadpole rearing in the bypass reach) (see Impact 4.6–1, Operational Impacts, Aquatic Habitat).

It is possible that the Proposed Project could alter habitat conditions in the bypass reach or in the diversion pool in such a way that would facilitate the establishment and dispersal of bullfrog populations. Bullfrogs are known predators to other amphibian species and are known to carry and transmit *Chytrid* fungus to other amphibian species. The Proposed Project would reduce flows primarily in the colder seasons (winter/spring) and have limited effect on natural flows during the summer/fall when bullfrog tadpole and juvenile rearing occurs (see Impact 4.6–1 Operational Impacts, Aquatic Habitat). In addition, the diversion can only divert 105 cfs, so high flow scouring events would still occur in the system, which would help reduce establishment of bullfrogs, The diversion pool is small (similar to existing large pools in the river) and will not exist when the Proposed Project is not operating and the diversion pneumatic gates are down (flows are too low to operate). Also, the Proposed Project will not alter stream channel structure to favor bullfrog over other amphibian species, therefore, the potential for this effect is minimal.

In addition, Rugraw is required to develop a Construction Plan that will include measures to prevent introduction and establishment of aquatic invasive species and is required to implement an Biological Monitoring Plan that includes reporting of invasive species and California red–legged frogs, and modification of the plan in coordination with State Water Board staff, CDFW, USFWS, and NMFS in the event these species are identified.

As stated previously, bullfrogs are known to carry and transmit Chytrid fungus to other amphibian species. Chytrid fungus resides in aquatic habitats and causes a disease (Chytridiomycosis) known to result in high mortality of native frog populations (Vredenburg et al., 2010; Adams et al., 2017). Chytrid fungus can also spread to uninfected drainage areas on contaminated clothing or equipment that is not properly treated to kill any potential chytrid fungus. The Aquatic Monitoring Plan would include decontamination or other similar measures to minimize the potential for introduction of Chytrid fungus. The plan would be developed in consultation with agencies, and, upon approval, implemented by Rugraw.

Downstream of the powerhouse, habitat would essentially be unmodified for special–status amphibians and aquatic reptiles (all natural flow will be in the river).

With implementation of Applicant–proposed measures, and other identified management and monitoring plans, the Proposed Project would maintain foothill yellow–legged frog, Cascades frog, California red–legged frog, and Western pond turtle distribution, abundance, growth, and health similar to the No Project conditions.

Special–Status Fish Species

Downstream of the Proposed Project powerhouse, Chinook salmon and steelhead habitat would be unaffected by the Proposed Project as the physical environment would remain essentially unchanged. Chinook salmon and steelhead are not present in the downstream area or the bypass reach. They would only enter the bypass reach if they successfully pass the downstream diversion dams (Coleman, Inskip, and South Diversion), which are slated for removal or to be modified with construction of new passage structures, and navigate through natural barriers at Panther Grade and Powerhouse Falls at the powerhouse tailrace (RM 20.6). The Anadromous Fish Monitoring Plan would ensure monitoring for anadromous fish entering the bypass reach and would provide subsequent management measures if they were determined to be present. These measures would protect spring spawning habitat for steelhead and spring rearing habitat for spring–run Chinook salmon and steelhead fry, that otherwise could be affected by the Proposed Project bypass reach flow reductions. With implementation of proposed measures, the Proposed Project would not affect the distribution, abundance, and growth, and health of special–status anadromous fish.

Operation and Maintenance Impacts – Biological (Resident Fish, Special–status Amphibians and Aquatic Reptiles, Special–status Fish Species)

- **Level of Significance:** Less Than Significant Impact
- **Mitigation Measures:** None required

4.6.6.2 Impacts Related to Movement of Wildlife and Wildlife Nursery Sites

IMPACT 4.6–2: Would the Proposed Project interfere substantially with the movement of any native resident or migratory wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?

The Proposed Project includes a diversion dam that would be an upstream fish passage barrier but provides for downstream passage and protects fish from entrainment into the powerhouse via a fish screen and a fish return system. The Proposed Project also reduces flows in a 2.3–mile–long bypass reach of South Fork Battle Creek that could affect movement of aquatic species.

There are a number of existing manmade and natural upstream fish passage barriers in the vicinity of the Proposed Project. Existing fish passage barriers are discussed in the Environment Setting Section 4.6.2. Downstream of the bypass reach on South Fork Battle Creek there are several hydropower dams that preclude upstream passage of anadromous fish (Figure 4.6–1**)**. These are slated for removal or construction of passage facilities as part of the BCSSRP. In addition, the bypass reach is upstream of at least two natural fish barriers, Panther Grade (RM

18.9) and Powerhouse Falls (RM 20.6) (Figure 4.6–2). These two natural barriers have a high probability of being complete barriers to anadromous fish (Cramer et al. 2015) (Figure 4.6–2) and, therefore, have a high probability of precluding anadromous fish from entering the bypass reach. Within the bypass reach, Angel Falls, approximately 1.7 miles upstream of the proposed powerhouse, is a natural, absolute fish barrier (Figure 4.6–2, Figure 4.6–3).

The Proposed Project may divert up to 105 cfs (with a 13 cfs minimum bypass flow) and would reduce flows in the 2.4–mile–long bypass reach. Figure 4.6–19, Figure 4.6–20, Figure 4.6–21, and Figure 4.6–22 show time series and monthly exceedance plots of daily average flows in the bypass reach under the Proposed Project, Alternative 1, and No Project for the synthetic hydrology (1929 to 2004) and 2015 to 2019 measured hydrology POR. The least amount of change, as a result of the Proposed Project, occurs during the low flow season, August through December, when the Proposed Project often would not operate due to low natural inflows less than 18 cfs. The greatest amount of flow change occurs in the wetter season, January through July. Lower flows in the bypass reach could affect fish passage.

Below Powerhouse Reach

Construction, Operation, and Maintenance

Downstream of the proposed powerhouse, all of the diverted flow is returned to the river and the flow regime is the same as the unimpaired hydrology. There are no Proposed Project facilities downstream of the powerhouse. Therefore, the Proposed Project would not affect passage or movement of any native resident or migratory aquatic species or impede the use of any native aquatic species nursery sites in lower South Fork Battle Creek downstream of the powerhouse. Therefore, no impact would occur.

Construction, Operation, and Maintenance Impacts – Below Powerhouse Reach

- **Level of Significance:** No Impact
- **Mitigation Measures:** None required

Bypass Reach

Construction

Rugraw will maintain upstream and downstream fish passage during all in–water work. Any special–status amphibians or aquatic reptiles encountered during construction, either in water or on land, will be relocated by a qualified biologist outside of the construction area. Wildlife movement may be slightly impeded, but ultimately would not be substantially impacted by construction activities. The impact would be less than significant.

Construction Impacts – Bypass Reach

- **Level of Significance:** Less Than Significant Impact
- **Mitigation Measures:** None required

Operation and Maintenance

Resident Fish

The Proposed Project diverts up to 105 cfs (13 cfs minimum flow) and reduces flows in the 2.4–mile–long bypass reach. Figure 4.6–19, Figure 4.6–20, Figure 4.6–21, and Figure 4.6–22 show time series and monthly exceedance plots of daily average flows in the bypass reach under the Proposed Project, Alternative 1, and No Project for the synthetic hydrology (1929 to 2004) and 2015 to 2019 measured hydrology POR. The least amount of change, as a result of the Proposed Project, occurs during the low flow season, August through December, when the Proposed Project often does not operate due to low natural inflows less than 18 cfs. The greatest amount of flow modification occurs in the wetter season, January through July.

Overall, due to the annual natural low flows and periodic natural dewatering in the bypass reach, the habitat carrying capacity for resident fish is limited by natural conditions that occur when the Project would not be operating. Extremely low or a complete lack of flow during late summer and fall occurs in the bypass reach when the Proposed Project is not diverting (when flows are less than18 cfs) (Figure 4.6–6, Figure 4.6–19, Figure 4.6–20, Figure 4.6–21, and Figure 4.6–22). Particularly during drought years, when much of the bypass reach naturally dewaters, the reach can be seasonally uninhabitable for resident fish (some fish may be able to move downstream past upstream fish passage barriers to where flows exist). Re–seeding of fish populations in the bypass reach following dewatering in dry years most likely occurs by fish moving downstream during high flow from populations present in the upper watershed. Impassable upstream passage barriers over a wide range of flows below or within the bypass reach (see Impact 4.6–2) would preclude upstream reseeding from downstream populations. This is important because under other circumstances, the lower flows in the bypass may could make upstream reseeding more difficult. The Proposed Project would not affect high flow downstream reseeding.

When flows are above 418 cfs, the Proposed Project pneumatic diversion gates would be lowered and all flow would pass unobstructed downstream. When flows are less than 418 cfs, a fish screen that is compliant with CDFW and NMFS standards (see *Chapter 2, Proposed Project Description*, Section 2.3.1) will prevent fish moving downstream from entering the flowline and fish would be returned to the creek downstream of the diversion dam via the fish return system. The fish screen would protect resident fish from entrainment into the powerhouse and subsequent injury or death.

The diversion dam would create an upstream passage barrier, 0.7 mile upstream of Angel Falls, during the operation season (winter, spring, early summer) (Figure 4.6–19). Fish above Angel Falls would not be able to move upstream past the dam when the Proposed Project is operating. During higher flows when the pneumatic gates are lowered and during the summer and fall when the Proposed Project is not operating fish would be able to pass upstream. As this is a resident fish population and downstream seeding into the stream segment would still occur, there would be limited impact to the distribution, abundance, growth, or heath of the fish. Resident fish in small streams often have relatively small home ranges, with some individuals moving longer distances seasonally (Gowen and Fausch 1996; Jenkins et al.1999; Hilderbrand and Kershner 2000; Rodriguez 2002; Graf 2008). The impact would be less than significant.

Operation and Maintenance Impacts – Bypass Reach (Resident Fish)

- **Level of Significance:** Less Than Significant Impact
- **Mitigation Measures:** None required

Special–Status Amphibians and Aquatic Reptiles

Foothill yellow–legged frog, Cascades frog, California red–legged frog, and Western pond turtle movement would not be affected by the Proposed Project. Each of the species would be able to navigate around the Proposed Project diversion dam. The dam abutments allow amphibians to safely move upstream past the dam. The reduced flows in the bypass reach would not affect movement of these species as they use slow water habitats and move on land along the riparian corridor.

Operation and Maintenance Impacts – Bypass Reach (Special–status Amphibians and Aquatic Reptiles)

- **Level of Significance:** No Impact
- **Mitigation Measures:** None required

Special–Status Fish Species

Chinook salmon and steelhead are not present in the bypass reach. They would only enter the bypass reach if they: (1) successfully migrated pass the downstream diversion dams (Coleman, Inskip, and South Diversion), which are slated for removal or construction of passage structures, and (2) successfully migrate through natural barriers at Panther Grade (RM 18.9) and Powerhouse Falls near the powerhouse tailrace (RM 20.6). Although unoccupied, the bypass reach includes designated Critical Habitat for steelhead up to Angel Falls (RM 22.3) and spring–run Chinook salmon up to RM 21.4. Historical presence of these species above Angel Falls is not known, because the designation was made after downstream barriers to anadromous fish passage had been in place for many years.

The Proposed Project includes an Anadromous Fish Monitoring Plan that has a flow trigger, 2.5–year return interval flow event (November 1 through May 31), for initiation of snorkeling surveys in the bypass reach below Angel Falls to identify if anadromous fish have successfully migrated upstream over natural barriers. If anadromous fish are observed, Rugraw must release a 30 cfs pulse for 48 hours every four weeks (November 1 through May 31), and prepare a Biological Assessment and informally consult with NMFS to determine if (1) the Proposed Project operations are adversely affecting anadromous salmonids, (2) what actions Rugraw will take to minimize or eliminate any adverse effects, and (3) if opening the license is necessary.

It is possible that if Chinook salmon or steelhead were able to access the bypass reach the minimum flow of 13 cfs that occurs during the winter, spring, and early summer as a result of Proposed Project operations (Figure 4.6–19, Figure 4.6–20, Figure 4.6–21, and Figure 4.6–22) could affect both adult steelhead upstream movement/spawning and downstream juvenile Chinook salmon and steelhead movement (i.e., outmigration). Typically spring–run Chinook salmon adult holding and spawning (summer/fall) would be affected by naturally low flows and warm water temperatures in the bypass reach, but not affected by the Proposed Project as the Proposed Project would not be operating when flows are less than 18 cfs (Figure 4.6–19, Figure 4.6–20, Figure 4.6–21, and Figure 4.6–22). To address potential impacts to adult

steelhead upstream movement in the bypass reach, a fish passage study would be required to identify the range of flows that provide adult upstream passage over the potential natural barriers in the bypass reach (Cramer et al. 2015; Impact 4.6–2 Fish Passage Barriers). Also, an analysis of the pulse flow amount, timing, and duration would be needed to address juvenile fish migration. Without such a study and resulting management actions, the impact would potentially be significant. Recommended Measure AQU–5 would require Rugraw to conduct a study and analysis and facilitate adult salmonid upstream passage and juvenile salmonid out–migration. Implementation of AQU–5 would make the impact less than significant with mitigation. However, Rugraw has not approved of this measure, so the impact would be significant and unavoidable.

Operation and Maintenance Impacts – Bypass Reach (Special–status Fish Species)

- **Level of Significance:** Significant and Unavoidable
- **Recommended Measure AQU–5: Anadromous Fish Monitoring Plan – Fish Passage Study.** The Anadromous Fish Monitoring Plan would include a fish passage study in the event fish are observed in the bypass reach to identify the flow range that provides adult upstream passage over the potential barriers in the bypass reach (Cramer et al. 2015; Impact 4.6–2 Fish Passage Barriers) and an analysis of the pulse flow amount, timing, and duration needed to assist juvenile fish out–migration. After the study is completed, Rugraw would consult with the agencies (CDFW, USFWS, SWRCB, and NMFS) to determine whether the pulse flow should be modified to reduce impacts to anadromous fish passage.

4.6.6.3 Impacts Related to Local Policies or Ordinances

IMPACT 4.6–3: Would the Proposed Project conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

Construction, Operation, and Maintenance

The Tehama County General Plan, Open Space and Resource Conservation Element contains the policies and implementation measures related to aquatic resources. These are outlined in Section 4.6.3 Regulatory Setting (local).

The Proposed Project complies with the Tehama County General Plan policies and implementation measures. Environmental protection measures outlined in this EIR that were designed to address any potential project impacts to biological resources have been developed in coordination with the CDFW, NMFS, and USFWS. Additionally, a final Environmental Impact Statement (EIS) was developed by FERC for the Proposed Project in July of 2018. Some of the environmental protection measures described in the EIS and this EIR include:

- General Construction measures such as developing a SWPPP and limiting in–water work to July 1 – October 15 to limit impact to sensitive habitat.
- Biological Resource Protection Measures such as maintaining fish passage during construction, monitoring during construction, conducting pre–construction inspections, and avoiding disturbance to aquatic habitats to the extent possible.

- Amphibian Protection Measures related to pre–construction surveys and avoiding construction activities when frog egg masses are present.
- Monitoring Plans including anadromous fish monitoring, water temperature monitoring, turbidity and pH monitoring, aquatic and invasive species monitoring, debris and sediment management, and erosion control.
- Additional Water Quality protection measures including minimum instream flow, gaging, ramping rages, water quality monitoring and annual consultation.

For a list of the environmental protection measures, refer to Impact 4.6–1 and Impact 4.6–2. *Chapter 2, Project Description*, Section 2.3.4 describes the Applicant Proposed Measures in detail and Section 2.3.5 describes the other environmental management and monitoring plans that were developed through a collaborative effort with FERC, applicable state and federal agencies, the public, and Rugraw.

The Proposed Project would not conflict with local ordinances as outlined in the Tehama County General Plan as a result of the environmental resource management plan requirements that have been included in the Proposed Project.

Construction, Operation, and Maintenance Impacts

- **Level of Significance:** Less Than Significant Impact
- **Mitigation Measures:** None required

4.6.6.4 Impacts Related to Conservation or Restoration Plans and Projects

IMPACT 4.6–4: Would the Proposed Project conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state Habitat Conservation Plans?

Construction, Operation, and Maintenance

The BCSSRP is a restoration project focused on anadromous fish habitat and removing dams/barriers to anadromy downstream of natural fish barriers on South Fork Battle Creek (potentially approximately 18.9 miles of habitat) and North Fork Battle Creek (approximately 13.5 miles of potential habitat) (Figure 4.6–1). The Proposed Project bypass reach is located on a 2.4–mile section of South Fork Battle Creek upstream of the BCSSRP dam barrier removal locations on South Fork Battle Creek.

Chinook salmon and steelhead are not present in the Proposed Project bypass reach. They would only enter the bypass reach if they: (1) successfully pass the downstream diversion dams (Coleman, Inskip, and South Diversion), which are slated for removal or construction of passage structures, and (2) navigate through natural barriers at Panther Grade (RM 18.9) and Powerhouse Falls downstream of the proposed powerhouse tailrace (RM 20.6) (Figure 4.6–2). These two natural barriers have a high probability of being complete barriers to anadromous fish in South Fork Battle Creek (Cramer et al. 2015) (Figure 4.6–2). Although presently unoccupied, the bypass reach includes designated Critical Habitat for steelhead up to Angel Falls (RM 22.3) and spring–run Chinook salmon up to RM 21.4 (Figure 4.6–2). Historical presence of either of

these species below Angel Falls is not known, because the designation was made after downstream barriers to anadromous fish passage had been in place for many years.

The Proposed Project includes an Anadromous Fish Monitoring Plan that has a flow trigger, 2.5–year return interval flow event (November 1 through May 31), to initiate snorkeling surveys in the bypass reach below Angel Falls to identify if anadromous fish have successfully navigated upstream over natural barriers. If anadromous fish are observed, Rugraw will release a 30 cfs pulse for 48 hours every four weeks (November 1 through May 31), and prepare a Biological Assessment and informally consult with NMFS to determine if (1) the Proposed Project operations are adversely affecting anadromous salmonids, (2) what actions Rugraw will take to minimize or eliminate any adverse effects, and (3) if opening the License is necessary.

Downstream of the Proposed Project powerhouse, Chinook salmon and steelhead habitat would be unaffected by the Proposed Project as the physical environment would remain essentially unchanged (Impact 4.6–3 Operational Impacts Physical Environment).

Overall, the Proposed Project, which includes the Anadromous Fish Monitoring Plan, would protect the anadromous fish habitat and anadromous fish that the BCSSRP is trying to restore and there would be no adverse impact on the BCSSRP.

Construction, Operation, and Maintenance Impacts

- **Level of Significance:** Less Than Significant Impact
- **Mitigation Measures:** None Required

4.6.7 Alternatives

4.6.7.1 Alternative 1 – Instream Flows

Alternative 1 proposes a minimum instream flow that is greater than the 13 cfs minimum instream flow in the Proposed Project. Alternative 1 is based on a NMFS recommendation that FERC staff analyze alternative minimum flows in the Proposed Project bypass reach of 35 cfs (November 1 to March 1), 30 cfs (March 2 to May 31), and 25 cfs (June 1 to October 31) (FERC, 2018).

In their preliminary 10(j) recommendations for the Proposed Project, U.S. Department of the Interior (Interior) (2016) and NMFS (2016) (Recommendation 1), state that the MIF in the bypass reach should be 35 cfs (or natural inflow, if less) to provide for various habitat issues (e.g., rearing habitat, passage connectivity). The recommended flow is based on a PHABSIM analysis done by USFWS staff on six transects in the bypass reach provided by Cramer Fish Sciences (Interior 2016) that suggests the maximum average habitat for Chinook and steelhead juvenile life stages occurs at 35 cfs and the maximum for fry occurs at 25 cfs (Figure 4.6–14).

Subsequent to the Final EIS, NMFS concurred with FERC that the Proposed Project, including the proposed 13 cfs MIF, may affect, but is not likely to adversely affect ESA listed Central Valley spring–run Chinook salmon, California Central Valley steelhead, and their designated critical habitats. This determination was based on an additional condition proposed by NMFS and agreed to by Rugraw, specifically that if Chinook salmon and/or steelhead were detected in the bypass reach in the future, Rugraw would provide monthly pulse flows of 30 cfs (November to May), and would provide NMFS a Biological Assessment within 30 days. Upon NMFS review

and through informal consultation with Rugraw and FERC, NMFS would assess if Proposed Project operations are adversely impacting anadromous salmonids, whether additional mitigation measures are appropriate), and if the license should be re–opened (see Anadromous Fish Monitoring Plan).

Available Data

The Proposed Project, Alternative 1, and No Project hydrology data for the bypass reach are shown in Figure 4.6–19, Figure 4.6–20, Figure 4.6–21, and Figure 4.6–22, which include time series and monthly exceedance plots of daily average flows.

The available habitat versus flow relationships for the bypass reach are discussed in the Aquatic Habitat Section for the Proposed Project and are briefly restated here. The available rearing resident and the anadromous salmonid habitat versus flow relationships are shown in Figure 4.6–12 and Figure 4.6–14 and spawning versus flow relationships for the anadromous species are shown in Figure 4.6–15. The data sets are limited both in terms of quality and flow range. Figure 4.6–12 (Cramer et al. 2015 empirical modeling) is based on five cross–sections in the bypass reach and is only modeled up to approximately 40 cfs. Figure 4.6–14 (Interior 2016) is based on six cross–sections and is modeled to 65 cfs. Robust instream flow studies typically require a minimum of 18 to 20 cross–sections (Payne et al. 2004) to accurately represent habitat versus flow relationships and require data collection/modeling that represents a wide range of flows. Figure 4.6–15 (Cramer et al. 2015 empirical modeling) is based on measuring numerous habitats units, but only at two flows (13 cfs and 31 cfs)**.**

Alternative 1 Analysis

Resident Fish

Spawning habitat for resident rainbow trout likely increases with flow up through approximately 30 cfs (Figure 4.6–15). Resident rainbow trout are adapted to spawn during spring (e.g., March through May) high flows, typically initiating spawning as flows start to decline. Figure 4.6–19, Figure 4.6–21, and Figure 4.6–22 indicate that Alternative 1 has 17 cfs higher flows (30 cfs versus 13 cfs) for 40 percent to 50 percent more of the days in March through May. The amount of spawning habitat during those time periods would approximately double under Alternative 1 compared to the Proposed Project (compare flows with Figure 4.6–15).

However, rearing habitat is the limiting factor for resident rainbow trout in the bypass reach (Figure 4.6–13) under both Alternative 1 and the Proposed Project due to natural extremely low or completely dry flows during late summer and fall that would occur when the Proposed Project is not diverting (flows less than 18 cfs) (Figure 4.6–6, Figure 4.6–19, Figure 4.6–20, Figure 4.6–21, and Figure 4.6–22). Particularly during drought years, when much of the bypass reach dewaters naturally, the resident fish population is extirpated (some fish may be able to move downstream of the bypass reach, past upstream fish passage barriers to where flows exist).

Alternative 1, with higher minimum flows, would provide more spawning habitat than the Proposed Project, but overall, due to the annual natural low flows and periodic natural dewatering in the bypass reach, the habitat carrying capacity of the reach for resident fish is not limited by either proposed minimum flow but rather is limited by natural conditions that occur under both Alternative 1 and the Proposed Project. Therefore, Alternative 1 would not increase distribution, abundance, growth, or health of resident fish compared to the Proposed Project.

Special–Status Amphibians and Aquatic Reptiles

Foothill yellow–legged frog, Cascades frog, California red–legged frog, and Western pond turtle are species that use slow water habitats which are maximized at lower flows. Foothill yellow–legged frog are the species most likely to be present in the Proposed Project area/bypass reach. Foothill yellow–legged frog use spawning velocities typically less than 0.5 foot/second (maximum less than1.0 foot/second) and relatively shallow depths of typically less than 1.5 feet (maximum of less than 3.0 feet) (PCWA 2011). Tadpoles are found in low velocity, relatively shallow water very similar to the egg masses (PCWA 2010). Alternative 1 minimum flows (Figure 4.6–19, Figure 4.6–20, Figure 4.6–21, and Figure 4.6–22) would provide good base flow conditions for foothill yellow–legged frog, Cascades frog, and Western pond turtle aquatic habitat. However, there would be little difference in distribution, abundance, growth, or health of these species compared to the Proposed Project minimum flows.

Foothill yellow–legged frog spawning typically occurs after water temperature exceeds 12°C (54°F), which occurs mid–May to early June (Figure 4.6–9) in the bypass reach. Egg mass and early tadpole development rates are very dependent on water temperature. Water temperature modeling of 13 cfs versus 25 cfs in the bypass reach during May through June found nearly identical water temperature for the two flows (Watercourse 2015). Alternative 1 would require 30 cfs in May and 25 cfs minimum flows in June, compared to 13 cfs minimum flows in all months in the Proposed Project. Based on the Watercourse (2015) modeling, it appears water temperature would be nearly same for Alternative 1 and the Proposed Project and foothill yellow–legged frog breeding timing and early tadpole rearing conditions would be nearly the same. Also, water temperature habitat for Western pond turtles and Cascades frogs would be nearly the same for Alternative 1 and the Proposed Project.

Overall, Alternative 1 would not be expected to affect the distribution, abundance, growth, or health of foothill yellow–legged frog, Cascades frog, California red–legged frog, and Western pond turtle compared to the Proposed Project.

Special–Status Fish Species

Chinook salmon and steelhead are not present in the Proposed Project bypass reach. They would only enter the bypass reach if they: (1) successfully migrate pass the downstream diversion dams (Coleman, Inskip, and South Diversion), which are slated for removal or installation of passage structures, and (2) successfully navigate through natural barriers at Panther Grade and Powerhouse Falls near the powerhouse tailrace (RM 20.6). Although unoccupied, the bypass reach includes designated Critical Habitat for steelhead up to Angel Falls (RM 22.3) and spring–run Chinook salmon up to RM 21.4.

Both Alternative 1 and the Proposed Project include an Anadromous Fish Monitoring Plan that has a flow trigger, 2.5–year return interval flow event (November 1 through May 31), for initiation of snorkeling surveys in the bypass reach below Angel Falls to identify if anadromous fish have navigated upstream over both manmade and natural barriers and entered the bypass reach. If anadromous fish are observed, Rugraw will release a 30 cfs pulse releases for 48 hours every four weeks (November 1 through May 31). The minimum flows in Alternative 1 would equal or exceed the 30 cfs pulse flow prescription during this time period. Alternative 1 would provide the connectivity flows envisioned in the pulse flow concept continuously instead of periodically, November 1 through May 31, whenever natural flows were greater than 30 cfs. Alternative 1

would also include, similar to the Proposed Project, a requirement to prepare a Biological Assessment and informally consult with NMFS to determine if (1) the Proposed Project operations are adversely affecting anadromous salmonids, (2) what actions Rugraw will take to mitigate for adverse effects, if that has been determined, and (3) if opening the license is necessary.

If anadromous fish become present, both the Proposed Project and Alternative 1 would not affect spring–run Chinook salmon adult holding, spawning, or stream–type juvenile habitat. This is because during the adult holding and spawning season the natural water temperature in the bypass reach would typically preclude holding (i.e., the water temperature would be too warm) (Figure 4.6–9) and the Proposed Project would not be operating during the naturally low flow, September spawning season (Figure 4.6–19, Figure 4.6–20, Figure 4.6–21, and Figure 4.6–22). For stream–type Chinook salmon juveniles residing in the bypass reach, habitat carrying capacity would be severely limited by natural low, summer/fall flows (Figure 4.6–12, Figure 4.6–13, Figure 4.6–19, Figure 4.6–20, Figure 4.6–21, and Figure 4.6–22) and high water temperatures (Figure 4.6–10) for both Alternative 1 and the Proposed Project. Alternative 1 could, however, benefit spring rearing habitat for ocean–type fry (fry that migrate in the spring after emerging from redds) compared to the Proposed Project due to increased flows in the bypass reach and increased rearing habitat (Figure 4.6–12, Figure 4.6–13), but only if the number of juveniles present exceeded the habitat carrying capacity available at 13 cfs in the Proposed Project (Figure 4.6–12 Figure 4.6–14, Figure 4.6–19, Figure 4.6–20, Figure 4.6–21, and Figure 4.6–22). A more detailed instream flow study that: (1) covered the full range of hydrology, (2) addressed habitat related to fish density/carrying capacity, and (3) used current fry rearing habitat suitability criteria (including cover) would be needed to assess the question related to spring rearing habitat impacts for ocean–type fry, if Chinook salmon gained access to the bypass reach. Recommended Measure AQU–5 adds this more detailed instream flow study into the Anadromous Fish Monitoring Plan, to be implemented if anadromous fish are able to access the bypass reach.

Steelhead spawning habitat within the bypass reach could be benefited by Alternative 1 compared to the Proposed Project in late winter/spring (Figure 4.6–15, Figure 4.6–19, Figure 4.6–20, Figure 4.6–21, and Figure 4.6–22) and spring rearing habitat for fry could also be benefited (Figure 4.6–12), but only for fry that move downstream out of the bypass reach at the end of their first spring. Over–summering rearing habitat/carrying capacity of fry/juveniles would not be affected by the proposed minimum flows in Alternative 1 or the Proposed Project as rearing capacity would be severely limited by natural low summer/fall flows (Figure 4.6–19, Figure 4.6–20, Figure 4.6–21, and Figure 4.6–22) and high water temperatures (Figure 4.6–10) unrelated to Proposed Project operations. To address potential impacts to spring spawning and fry rearing habitat, a more detailed instream flow study that (1) covered the full range of hydrology, (2) addressed habitat related to fish density/carrying capacity, and (3) used current fry rearing habitat suitability criteria would be needed, if steelhead gained access to the bypass reach.

Overall, Alternative 1 has the potential to benefit spring–run Chinook salmon or steelhead Critical Habitat compared the Proposed Project, if anadromous fish were present in the bypass reach. The Anadromous Fish Monitoring Plan would ensure monitoring for anadromous fish to determine if anadromous fish were entering the bypass reach and would provide subsequent mitigation measures, if they were determined to be present in the bypass reach. In the even

anadromous fish were present in the bypass reach, Rugraw would prepare a Biological Assessment and informally consult with NMFS and FERC to determine if (1) the Proposed Project operations are adversely affecting anadromous salmonids, (2) what actions Rugraw will take to minimize or eliminate any adverse effects, and (3) if opening the license is necessary would adequately protect these species.

Conclusion

Alternative 1 would not improve resident fish or special–status amphibians and aquatic reptiles compared to the Proposed Project. Alternative 1 could have the potential to benefit Chinook salmon ocean–type fry habitat and steelhead spawning habitat and habitat for fry that move downstream in the spring compared to the Proposed Project, but only if Chinook salmon and steelhead adults access the bypass reach successfully migrate pass the downstream diversion dams and navigate through natural barriers at Panther Grade (RM 18.9) and Powerhouse Falls near the powerhouse tailrace (RM 20.6). If anadromous fish are documented in the bypass reach based on monitoring surveys required in the license, then the licensee is required to prepare a Biological Assessment. The requirement in the Proposed Project to prepare a Biological Assessment and informally consult with NMFS and FERC to determine (1) if the Proposed Project operations are adversely affecting anadromous salmonids, (2) what actions Rugraw will take to mitigate for adverse effects, if adverse effects have been determined, and (3) if opening the license is necessary, would adequately protect anadromous fish. As discussed above, the assessment would benefit from implementation of a more comprehensive instream flow study in the future (see Recommended Measure AQU–5). In general, for the reasons above, Alternative 1 and the Proposed Project are expected to be similar in terms of protection of the environment, special–status amphibians and reptiles, and resident rainbow trout, and would be similar overall in terms of how they meet the Proposed Project objectives.

4.6.7.2 Alternative 2 – Ramping Rates

Alternative 2 evaluates ramping rates, including the following: (1) the appropriateness of a 1.0 inch per hour down ramping and/or up ramping rate for protecting biological resources, and (2) additional analysis to derive a down ramping rate that is protective of foothill yellow–legged frog breeding habitat (e.g., Yarnell et al., 2016), specifically related to potential foothill yellow–legged frog egg mass/tadpole dewatering. The previously analyzed (FERC 2018) and agency recommended ramping rates (0.1 foot per hour or 1.0 inch per hour) (e.g., FERC 2018; CDFW 2016; NMFS, 2016) did not distinguish between down ramping and up ramping rates; did not distinguish between Proposed Project–affected and natural ramping rates.

CDFW, in its (2016) 10(j) submittal to FERC, recommended a 0.1 foot per hour down ramping rate in the bypass reach when water is being diverted and put into the conveyance system (i.e., down ramping). Rugraw adopted CDFW's 10(j) recommendation in a letter August 31, 2016 (FERC, 2018). NMFS (NMFS, 2016) 10(j) recommendation was 1.0 inch per hour ramping rate, which corresponds to a frequently recommended down ramping rate for hydropower projects. The ramping rate was developed by Hunter (1992) to protect salmonid fry from stranding during down ramping. However, NMFS's recommendation did not identify if the ramping rate was an up ramping and/or down ramping rate.

In the FERC EIS (2018), the Proposed Action Environmental Measures identified a ramping rate of 0.1 foot per hour and the FERC Staff Alternative adopted a 1.0 inch per hour ramping rate as

being slightly more protective. The recommended ramping rate measure did not distinguish between Proposed Project and non–Project[31] affected ramping rates; down ramping and up ramping environmental effects; and seasonal species/lifestage effects (e.g., fish fry stranding and foothill yellow–legged frog egg masses/tadpole dewatering or displacement).

The 1.0 inch per hour ramping rate in the FERC (2018) Staff Alternative ultimately is derived from the Hunter (1992) literature review and recommendations that have been adopted in a large numbers of proceedings; however, the Hunter (1992) recommendations are seasonal down ramping rates specific to protecting fry stranding and are not up ramping recommendations. For example, Hunter (1992) stated:

> *The biological effects of unnatural flow increases are usually irrelevant in regulating hydropower operations because public safety concerns justify more stringent regulations than biological concerns. Flow increases can strand and occasionally drown fishermen and other people located on bars, rocks, or in confined canyons. Boaters might also be at risk under some circumstances. The remaining discussion in this review deals exclusively with the effects of decreases in flow…*
>
> *Stranding is the separation of fish from flowing surface water as a result of declining river stage. Stranding can occur during any drop in stage. It is not exclusively associated with complete or substantial dewatering of a river. Stranding can be classified into two categories: Beaching is when fish flounder out–of–water on the substrate. Trapping is the isolation of fish in pockets of water with no access to the free–flowing surface water….*

Olson (1990) determined that a down ramping rate of one inch/hour was adequate to protect steelhead fry. However, the ramping rate was measured at a confined river transect, whereas the stranding was observed on lower gradient bars further downstream. Thus, the effective ramping rate at these bars was less than one inch per hour.

With respect to foothill yellow–legged frogs, which potentially occur in the bypass reach, slow down ramping is needed to prevent dewatering of egg masses (Yarnell et al., 2016). Rugraw's down–ramping rate proposal of four inches over seven days (or one foot over three weeks) was proposed to prevent stranding of foothill yellow–legged frog egg masses and tadpoles during the foothill yellow–legged frog breeding and early rearing period (mid–April through mid–July).

Available Data

The existing information consists of (1) the general ramping rate requirement identified in the Proposed Project Operations (Section 2.3.2); (2) a new condition in the Proposed Project related to foothill yellow–legged frog egg mass dewatering; (3) the stage–discharge rating curve developed at the ABS site (see Figure 4.6–2) during the licensing studies; and (4) the down ramping and up ramping literature.

The ramping rate requirement identified in the Proposed Project Description (Section 2.3.2) is as follows:

[31] Non–project affected flow "ramping" is caused by storms flows or storm flow recessions or other natural events that are not controlled by the Proposed Project.

- Provide a ramping rate (both down and up ramping) that does not exceed one inch of stage change per hour as measured at the FERC staff recommended monitoring gage located just downstream of the diversion dam.

In the Proposed Project Description, in the FERC EIS (FERC 2018), and in agency comments, the ramping rate is not consistently described with respect to a down ramping rate or an up ramping rate or location. The down ramping rates are typically designed to protect against fish redd and egg mass dewatering, or fry stranding, whereas up ramping rates are typically designed to address recreational safety. Generally, site specific and life stage specific down ramping studies are conducted to identify biologically safe down ramping or conservative down ramping rates, one to two inches/hour (Hunter 1992), based on fry stranding experiments in the literature, are applied. In this Proposed Project agencies have suggested conservative rates and Rugraw has adopted a one inch/hour down ramping rate. With regard to up ramping rates, a clear discussion of up ramping rate was not identified in the record. Likewise, a clear description of the location where up or down ramping rates are applicable (downstream of the diversion dam and downstream of the powerhouse tailrace) has not occurred.

Following FERC's issuance of its EIS, Rugraw added a Special–Status Amphibian Protection Plan component related to foothill yellow–legged frog egg mass dewatering to the environmental measures. The component is as follows:

To protect foothill yellow–legged frog from spring base flow recession rates that could dewater egg masses, the plan should include: (1) a protocol for distinguishing base flow recessions from storm pulse recessions; (2) measures to avoid a greater than one–foot reduction in base flow over a three–week period; and (3) annual reporting that provides the stage record from May 1 through July 31, and identifies periods where operations were modified, if necessary, to protect foothill yellow–legged frog egg masses, or demonstrates that base flow stage reductions did not exceed the one foot per three–week threshold.

The stage–discharge (rating curve) data collected at the ABS site, downstream of the proposed diversion, is shown in Figure 4.6–24 with a two–part continuous function that approximately matches the empirical data over a wide range of flows. One–inch per hour down and up ramping rates and four–inch per week down ramping rates versus time to achieve the up/down ramps are shown in Figure and Figure . The natural down ramping of the spring hydrograph (2015 – 2019) is shown in Figure 4.6–27.

Numerous studies in California have shown that ramping rates in the one to six inches/hour range minimize adverse effects on fish and aquatic species. For example, in 2004, PacifiCorp completed a literature–based assessment of the potential impacts associated with ramping regimes in river reaches affected by the Klamath Hydroelectric Project. The study found that ramping rates ranging from 0.1– to 0.6–foot/hour resulted in minimal stranding and were well within the natural range of those found in unregulated river systems (PacifiCorp, 2004). PG&E also recently implemented a six–inch/hour or less ramping rate at the Spring Gap–Stanislaus Hydroelectric Project to avoid stranding or displacement of fish and other aquatic species. Hunter (1992), based on literature studies, recommended conservative interim fish stranding ramping criteria for projects of one inch/hour June16 to October 31 (day and night), two inches/hour November 1 to February 15 (day and night) and no ramping (day) and two inches/hour (night) February 16 to June 15. As discussed above (Hunter 1992), up ramping rates are typically recreation safety oriented rather than biological. Yarnell et al. (2016) identified

ramping rates similar to those in unimpaired rivers of less than 10 percent per day as likely to be protective of native species including foothill yellow–legged frog.

Alternative 2 Analysis

One–Inch/Hour Down and Up Ramping

Proposed Project–affected flow down ramping rates in the bypass reach below the Proposed Project diversion or downstream of the powerhouse tailrace could affect stranding of fish (e.g., fry), fish redds, foothill yellow–legged frog egg masses, and early age foothill yellow–legged frog tadpoles. Up ramping rates in the bypass reach or downstream of the powerhouse tailrace typically would have limited biological effect, but could be a recreation safety issue. Proposed Project–affected ramping rates refers to an up ramp or down ramp that is increased due to Proposed Project operations, even if the majority of the up ramp or down ramp is of natural origin (e.g., from fluctuating flows in the river upstream of the Proposed Project diversion dam).

When the Proposed Project diversion and powerhouse release amounts are synchronous, which is typically how a run–of–river project operates, then an up ramping event below the diversion in the bypass reach would be a commensurate down ramping event downstream of the powerhouse tailrace. Likewise, a down ramping event below the diversion in the bypass reach would be an up ramping event below the powerhouse tailrace. In the case of synchronous operations, maintaining Proposed Project affected up ramping and down ramping rates of one inch/hour or less at one location (e.g., downstream of the diversion dam as identified in the Proposed Project), would protect fish from stranding in both the bypass reach and the reach downstream of the powerhouse tailrace. A one inch/hour down ramp is a conservative ramping rate for protecting against fish stranding (Hunter 1992). An asynchronous down ramping event below the diversion and powerhouse tailrace, for instance when the flowline and penstock are filling during project startup, would also protect down ramping through the bypass reach and below the powerhouse tailrace; even if the powerhouse asynchronously came online at full capacity (105 cfs), the maximum up ramp downstream would be approximately one–foot (see Figure 4.6–24 between 18 cfs and 123 cfs), which is typically safe for recreation. Many FERC licenses have facilities with a one–foot/hour up ramp. An asynchronous stoppage of flow from the powerhouse could create a fast down ramp event below the powerhouse, but this typically could not occur without a commensurate up ramp below the diversion, which would be constrained by the one inch/hour up ramp requirement there.

Overall, the run–of–river operations (synchronous operations) with a one inch/hour Proposed Project affected up ramp and down ramp requirement at an appropriate location would protect fry stranding and recreation safety, and would protect against asynchronous operations that could be harmful. During many times of the year when young fry are not present, the one inch/hour up ramping and down ramping rate below the diversion would be overly protective related to fish stranding. Generally, it appears from Figure that the ramping rate would not overly restrict Proposed Project operations as the most limiting ramping sequence would take approximately 14 hours.

With respect to protecting fish redds and foothill yellow–legged frog egg masses, a one inch/hour down ramping will not be completely protective. Rainbow trout spawn at depths of approximately 0.5 foot and deeper (Figure) and foothill yellow–legged frog egg masses can be laid in water less than 10 cm (4 inches) deep (Figure). The one inch/hour down ramp would

create, in the most limiting case (diverting 105 cfs from a base 118 cfs), a total down ramp in the bypass reach of 1.3 feet (Figure 4.6–24). It is possible; therefore, that shallow rainbow trout redds would be dewatered if they were in cross–section shapes similar to the ABS rating curve. If they were in wider pool tailout areas, fewer redds would be dewatered. However, because the limiting factor for rainbow trout in the bypass reach is extreme low flows and high temperatures in the summer/fall, potential dewatering of some rainbow trout redds would not affect the overall distribution, abundance, growth, or health of the population. For foothill yellow–legged frog; however, if they are present and breeding in the bypass reach or downstream of the tailrace, egg masses on those areas could be dewatered (see egg mass depth distribution in Figure).

Foothill Yellow–Legged Frog Breeding Protection Down Ramping

As explained in Impact 4.6–1, the temperature regime in the bypass reach does not appear to be optimal for foothill yellow–legged frog breeding/survival. Temperatures in the bypass reach are only suitable for sustaining a foothill yellow–legged frog population (i.e., 17.6°C M30DAT and above [Kupferberg et al. 2011]) in the drier years. However, breeding could occur after sustained 12°C or greater water temperatures (Kupferberg et al. 2011). For the ABS site this would occur typically in late May through early July (Figure 4.6–27) and possibly in early May of extreme drought years (e.g., 2015). Foothill yellow–legged frog egg masses take longer to hatch in cold temperatures (e.g., 20 days to hatch in 12°C versus 14 days in 16°C [Kupferberg et al. 2011]), so a protective down–ramping rate must be slower than Rugraw's proposed 1 foot/3 weeks.

Natural stage recession at the ABS stage location 2015 through 2019 was approximately 10 cm/4 weeks (4 inches/4 weeks) (Figure 4.6–27). A protective down ramp rate at the ABS gage would ideally be correlated with the wider stream channel locations where foothill yellow–legged frog breed (less restrictive in terms of flow versus stage) or surveys of known egg masses locations. Assuming conservative circumstances (i.e., a narrow stream channel where stage change is greater), a down ramp of 4 inches/20 days during the breeding season (May 1 through July 31) would be protective of egg masses. As a large portion of the egg masses could be as shallow as 10 cm (4 inches) (Figure), and because at 12°C it can take up to 20 days to hatch (Kupferberg et al. 2011), a down ramp rate of 4 inches/20 days would be required to protect egg masses and early tadpoles. Therefore, Alternative 2 would have a less than significant impact to foothill yellow–legged frog breeding habitat.

Conclusion

Alternative 2 is similar to the Proposed Project, which includes a one inch/hour ramping rate and a separate ramping rate for foothill yellow–legged frog. Alternative 2, however, includes specifically both a one inch/hour Proposed Project affected down ramp and up ramp rate requirement downstream of the diversion at an agency–approved (e.g., CDFW, USFWS, State Water Board) site. Alternative 2 also includes an analysis–derived foothill yellow–legged frog Proposed Project–affected down ramping rate of 4 inches/20 days from May 1 through July 31 that is measured at foothill yellow–legged frog breeding locations or at a narrower (more conservative) stage–discharge location that is Agency approved. Alternative 2 and the Proposed Project are expected to be similar in terms of preventing fish stranding. However, Alternative 2 will be more protective of foothill yellow–legged frog egg masses and early

tadpoles than the Proposed Project, and would avoid potential impacts with the BCSSRP, which meets Objective 3.

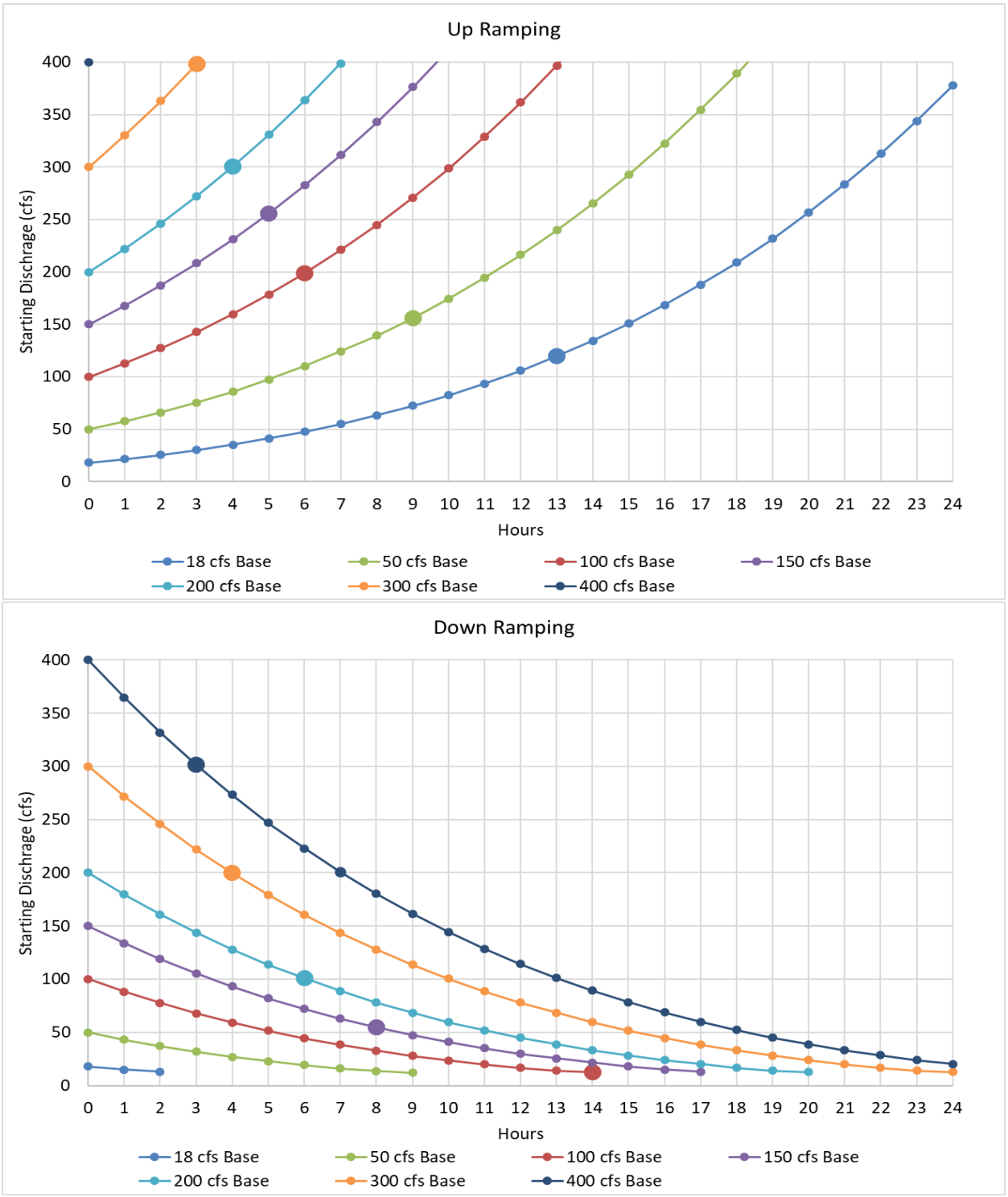

Figure 4.6–25. Up Ramping (Top) and Down Ramping (Bottom) at One Inch/Hour at the ABS Site Beginning at Various Starting or Base Discharges.

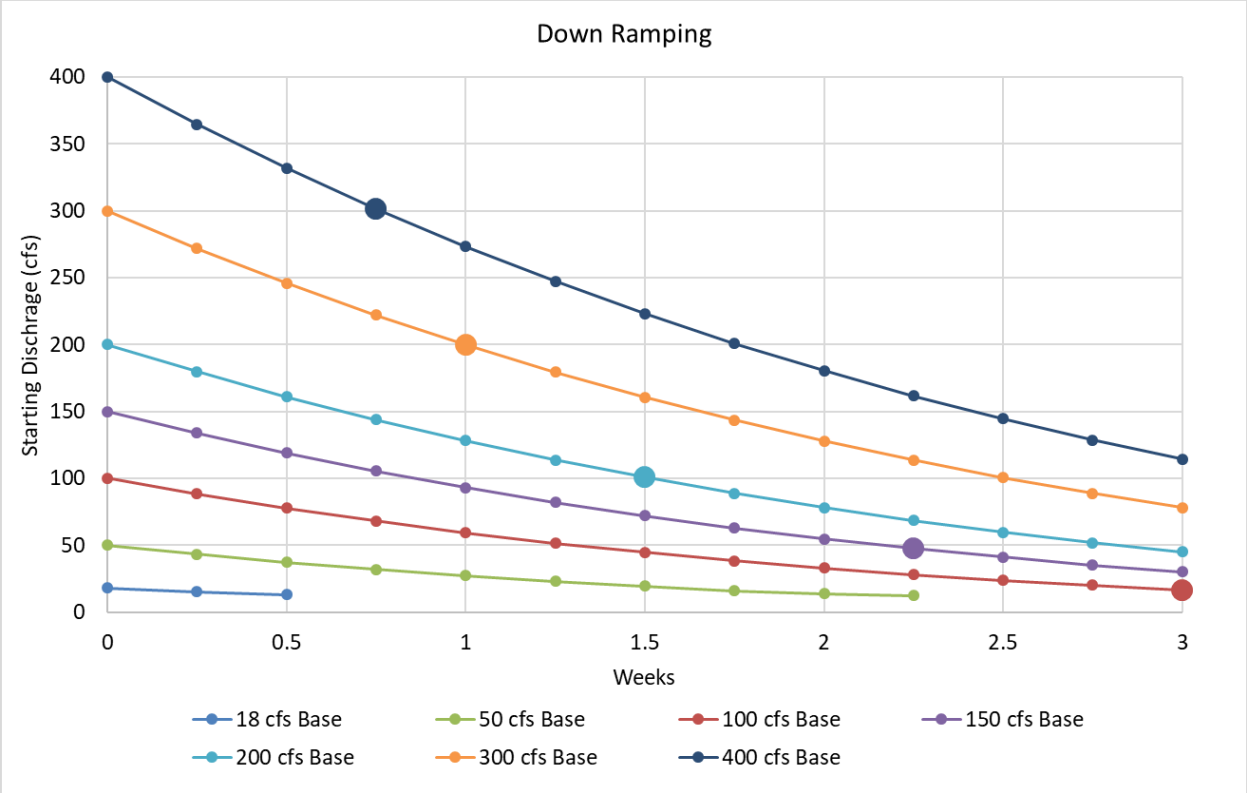

Figure 4.6–26. Down Ramping Rate of Four Inches/week at Various Starting Discharges/Base Flows.

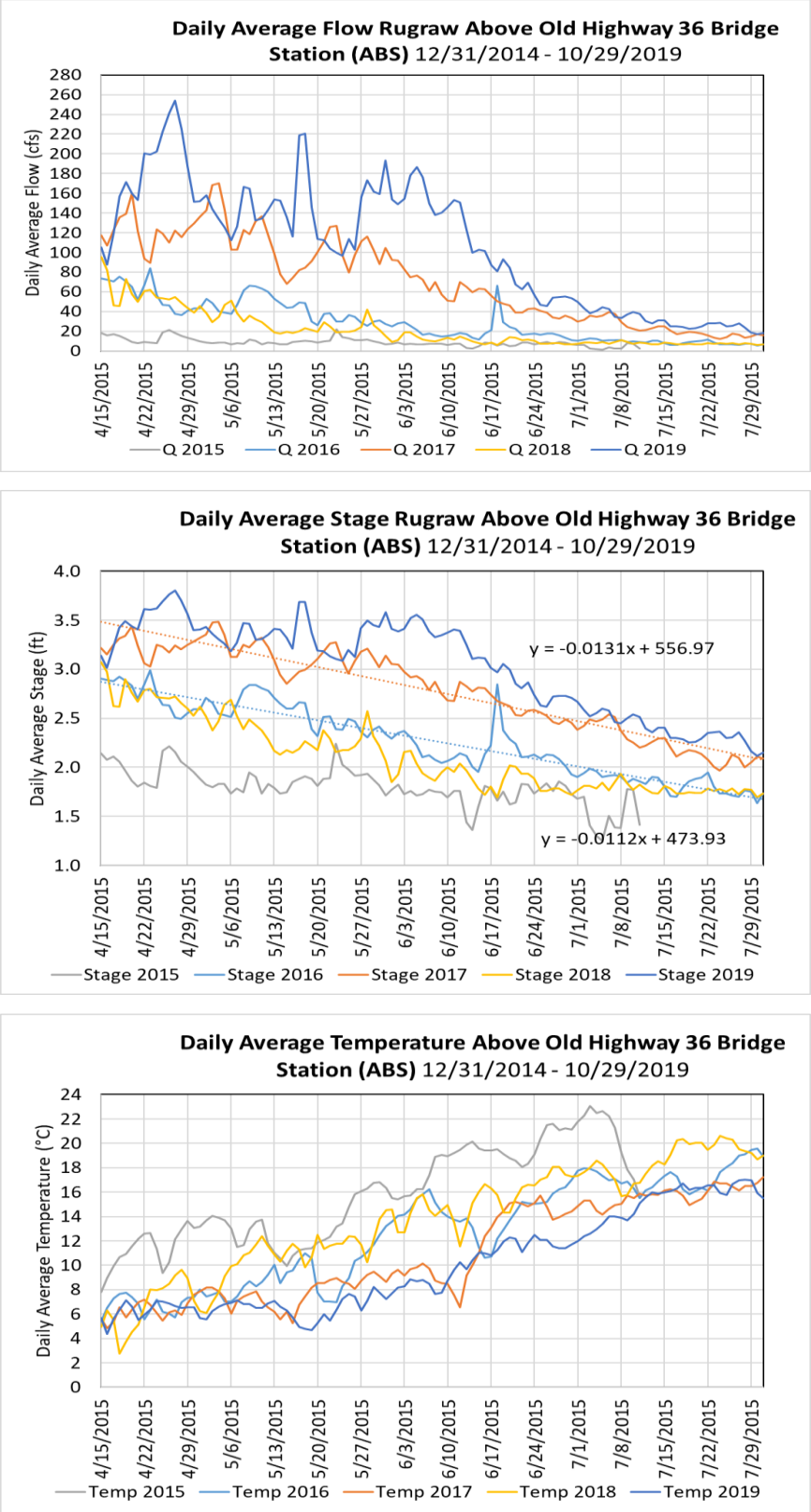

Figure 4.6–27. Discharge (Top), Stage (Middle), and Daily Average Temperature at the ABS Site (2015–2019).

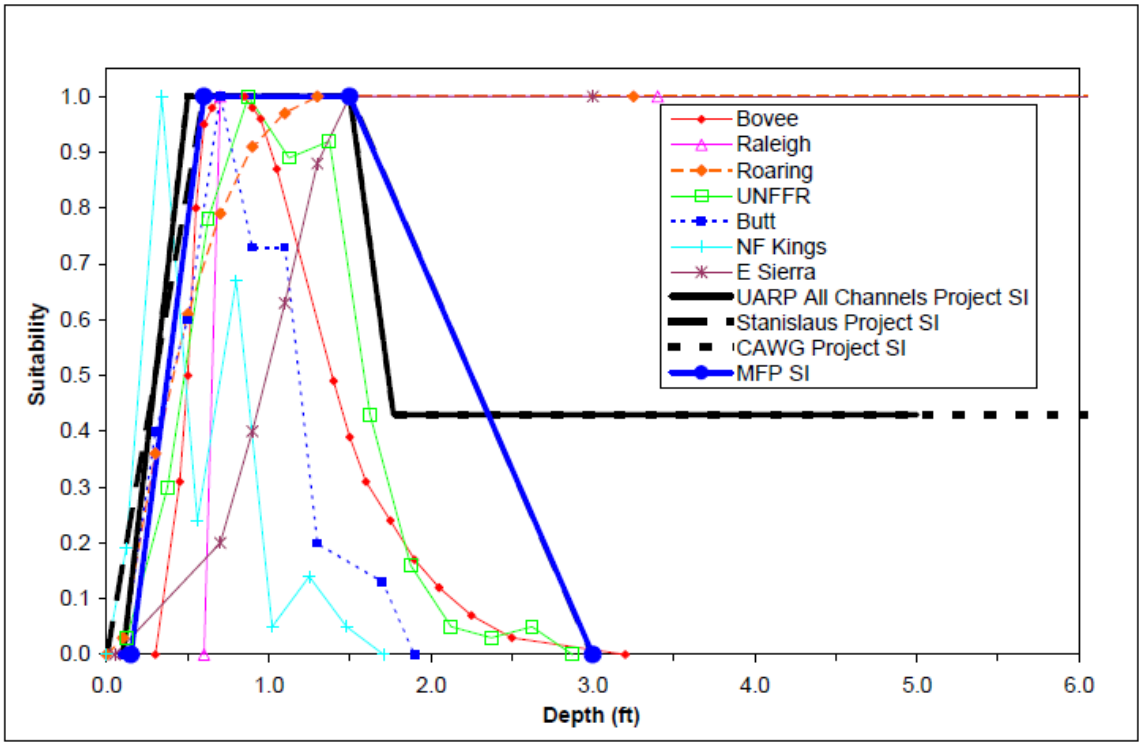

Figure 4.6–28. Rainbow Trout Spawning Habitat Suitability Curve Data Sets (PCWA 2010).

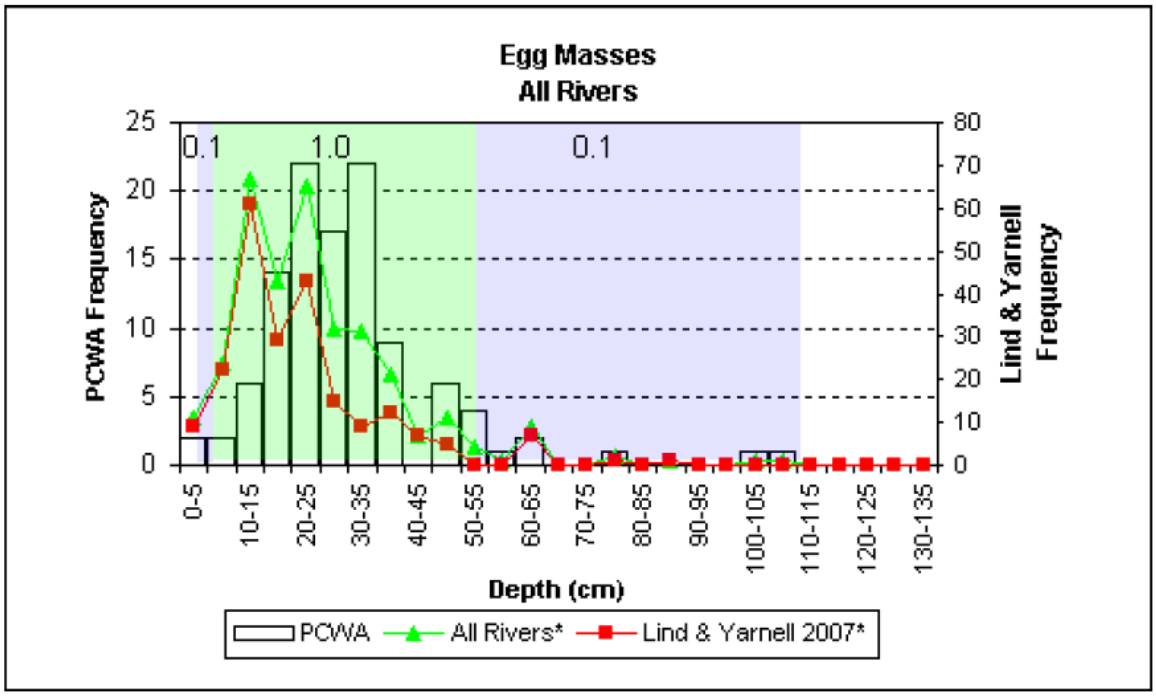

Figure 4.6–29. Distribution of Observed Foothill Yellow–Legged Frog Egg Masses (PCWA 2010) (all rivers is MFP data and Lind and Yarnell

(2007) from a combined data set from the West Branch Feather River (2006), Butte Creek (2006), and the Pit River (2002–2004).

4.6.7.3 Alternative 3 – Temperature Project Shutdown Thresholds

Alternative 3 identifies project temperature shutdown criteria to protect aquatic species and life stages during various seasons and uses empirical data to determine if the Proposed Project is cooling water temperature in the bypass reach (beneficial effect; allows Proposed Project operations to continue) or warming water temperature in the bypass reach (negative effect; requires Proposed Project shutdown). Alternative 3 explicitly evaluates Proposed Project–induced temperature effects in both the bypass reach and in the tailrace reach downstream of the powerhouse in the context of: (1) the existing conditions, where only resident salmonid species (e.g., rainbow trout) are present in the bypass reach, and (2) the potential future condition where ESA listed salmonids may access the bypass reach.

The Proposed Project incorporates an average daily temperature project shutdown threshold of 20°C if there is project–induced warming in the bypass reach based on real–time monitoring at the diversion and above Spring Number 4 (upstream of the powerhouse). The single criterion, 20°C average daily temperature, biologically is applicable to the summer season/life stages. CDFW also recommended an average daily temperature threshold of 20°C and State Water Board (2018) proposed 20°C 7DADM. Interior and NMFS 10(j) Recommendation 2 requested curtailing Project operation, as needed, to prevent temperature exceedances specific to seasonal/life stages of spring–run and winter–run Chinook salmon in the bypass reach downstream of Angel Falls as described in Table 4.6–7.

Table 4.6–7. Interior and NMFS Temperature Recommendations

Life Stage	Interior 7DADM	NMFS 7DADM
Spawning (November 1 to March 1)	13°C	13°C
Holding and Rearing (March 2 to May 31)	15.5°C[a]	16°C
Migration and Summer Holding (June 1 to October 31)	18°C	18°C

a. USFWS modified its previously recommended 16°C criterion during the March 15, 2018, section 10(j) meeting, where it indicated that it was now recommending 15.5ºC from March 2 to May 31 for spring–run and winter–run Chinook salmon holding and rearing and the same 7DADMs as NMFS for the rest of the year.

Available Data

Water temperature data from the ABS site and at Powerhouse Falls from 2015 to 2019 are shown in Figure 4.6–31. The shaded areas of the graph in Figure 4.6–26 indicate times when flow was below 18 cfs, and therefore, the Proposed Project would not have been diverting water or operating during those times. This graphic shows that temperatures above 20°C average daily or 7DADM rarely if ever occur when flows are greater than 18 cfs. Temperature exceedances above the NMFS 7DADM recommendations of 18°C 7DADM shown in Table 4.6–7 only occurred at ABS when flows are greater than 18 cfs during the summer of the wetter years, 2017 and 2019 (Figure 4.6–31, Figure 4.6–19, Figure 4.6–23). The NMFS criteria are based on EPA (2003) and the 18°C is consistent with the EPA (2003) “Salmon/Trout Migration plus Non–Core Juvenile Rearing” criteria.

Two data issues are important regarding water temperature shut–down criteria. One is the appropriate temperature criteria and the other is whether Proposed Project operations affect water temperature in the bypass reach.

Water Temperature Criteria

The EPA (2003) water temperature criteria are based on a literature review and a conservative (i.e., protective) use of the data assuming low food availability and diel fluctuations of 6°C (3°C above and below the average daily temperature). The effect of water temperature in rearing fish, for example, depends on food availability and the amount of temperature fluctuation. Under high food availability and a diel temperature fluctuation of 3.8°C, Hokanson et al. (1977) found that rainbow trout exhibited very high growth up to and including 21°C, but growth quickly became negative at 22°C. At lower food availability, the maximum growth temperature would decrease. Figure 4.6–30 shows juvenile rainbow trout growth rate curves at 70 percent, 50 percent, and 30 percent of maximum consumption. The high consumption corresponds approximately to Hokanson et al. (1977), but at lower consumption the growth rate goes negative six degrees cooler at approximately 16°C (Figure 4.6–30). Chinook salmon juveniles typically exhibit cooler growth responses than rainbow trout (Figure 4.6–30). In fluctuating temperatures, the bioenergetic growth response corresponds to approximately halfway between daily average and maximum daily temperature. During the summer in South Fork Battle Creek this is approximately 1.5°C above the daily average.

To protect rainbow trout against negative growth (loss of weight), assuming 50 percent maximum consumption and diel fluctuating temperature, a 19°C average daily criterion would be required[32] (see Figure 4.6–30) or a 22°C 7DADM criterion[33]. To protect Chinook salmon juveniles, a 16.5°C average daily or 19.5°C 7DADM criterion would be required.

The NMFS/EPA (2003) summer criterion of 18°C (Table 4.6–7) corresponds to approximately 16.5°C on Figure 4.6–30. The Proposed Project and CDFW 20°C average daily criterion corresponds to approximately 21.5°C on Figure 4.6–30 and the State Water Board 20°C 7DADM criterion corresponds to 18.5°C on Figure 4.6–30. Without field growth data, it is not possible to know what the percent of maximum consumption is for juvenile fish in South Fork Battle Creek. Assuming rainbow trout and steelhead are the primary summer target species, the NMFS 18°C 7DADM criterion is the most conservative and would protect for low consumption (30 percent), the Water Board 20°C 7DADM would protect for intermediate consumption (about 40 percent) and the Proposed Project/CDFW 20°C average daily criterion would protect for 50 percent consumption. For comparison, calculated percent of maximum consumption for Middle Fork American and Rubicon River trout ranged from 34 percent to 56 percent with an average of 56 percent (age 0+ and 1+ fish) (PCWA 2011).

Based on the above information, we assume the Proposed Project 20°C average daily criterion is reasonably protective of resident rainbow trout and the State Water Board 20°C 7DADM is more protective, but not substantially so. The NMFS criterion would be more appropriate if

[32] Where a 19°C daily average temperature + 1.5°C to address fluctuating water temperature = 20.5°C growth temperature, where growth becomes zero on the figure.

[33] Where a 22°C 7DADM temperature – 1.5°C to address fluctuation water temperature = 20.5°C growth temperature, where growth becomes zero on the figure.

steelhead juveniles were in the bypass reach. Chinook juveniles likely would not be able to rear through the summer in the Proposed Project area due to the naturally warm water temperature.

Proposed Project Operational Effects

Currently there are no data to suggest the Proposed Project would alter water temperature in the bypass reach or downstream of the Proposed Project when operating (Impact 4.6–1). The Water Temperature Monitoring Plan includes real–time temperature monitoring at the division dam, recording of flow being diverted into pipeline, and temperature upstream of Spring Number 4 (Figure 4.6–2) to determine in real–time if the Proposed Project is warming the bypass reach water temperature.

Alternative 3 Analysis

If the Proposed Project operations were shown in real–time to be warming the bypass reach, Alternative 3, with the NMFS 18°C 7DADM project shutdown criterion, would be more protective of juvenile steelhead and rainbow trout in the bypass reach during early summer of wetter years when the Proposed Project is operating than either the Proposed Project 20°C daily average or the State Water Board 20°C 7DADM criterion (Figure 4.6–31). However, because of the natural high temperatures and extremely low flows that occur each year in late summer/early fall when the Proposed Project would not be operating, it does not appear that the lower NMFS criterion would provide added value to the protection of rainbow trout. Generally, neither the Proposed Project 20°C average daily or the State Water Board 20°C 7DADM criterion would be implemented very often because these temperatures only occur when flows are less than 18 cfs and the Proposed Project would not be operating because natural flows are too low (Figure 4.6–31).

Conclusion

With Rugraw's proposed measures regarding evaluation and potential opening of the license if anadromous fish are documented in the bypass reach, Alternative 3 is also expected to be substantially similar to the Proposed Project. Overall, Alternative 3 is not expected to be substantially more protective of anadromous or resident fish or substantially different in terms of avoiding potential conflicts with the BCSSRP, which meets Objective 3.

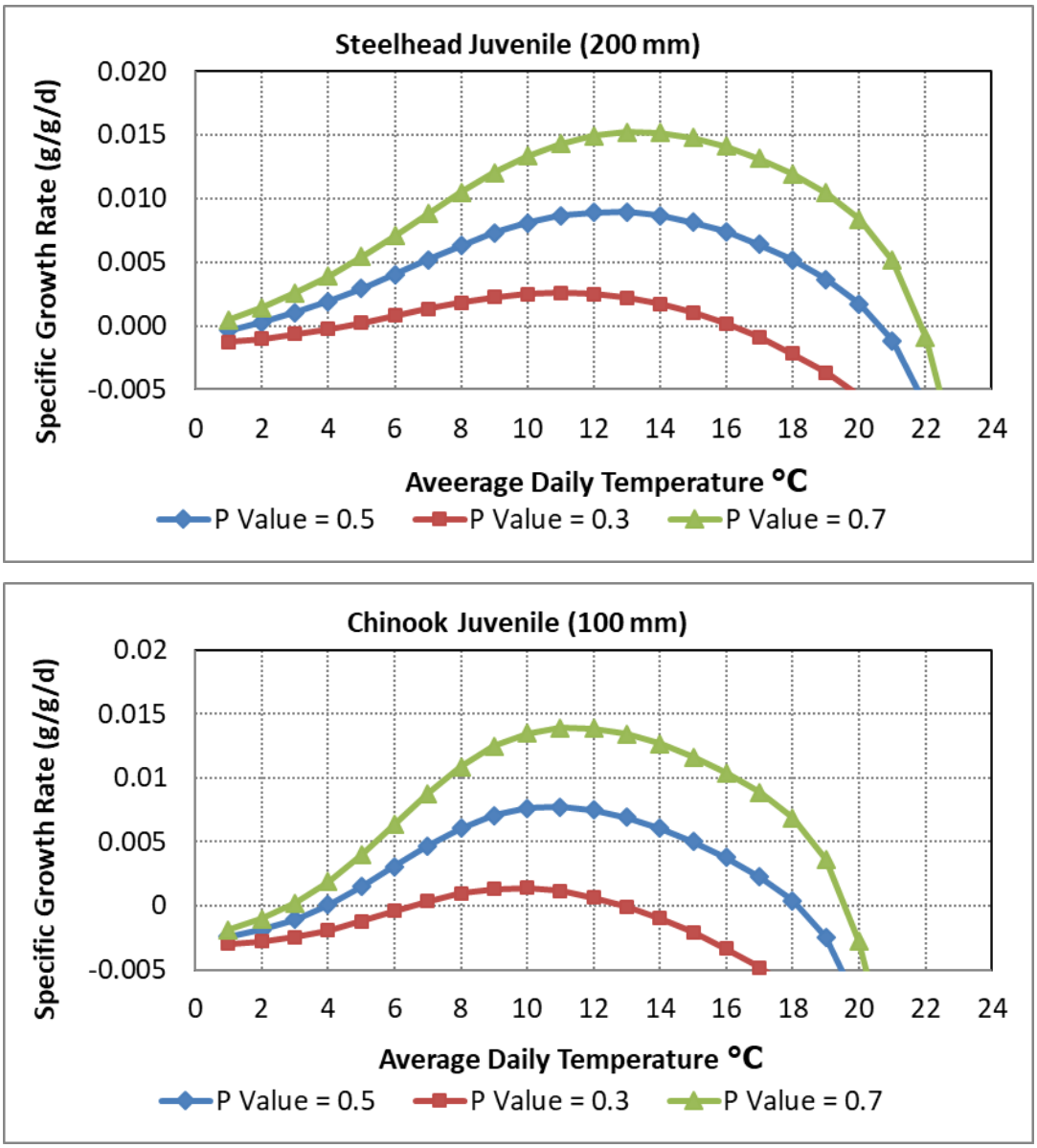

Figure 4.6–30. Bioenergetics Growth Curves for Steelhead and Rainbow Trout (200 mm length) (Top) and Chinook Salmon (100 mm length) (Bottom) (Source: Hanson 1997; Rand et al. 1993; Stewart and Iberra 1991).

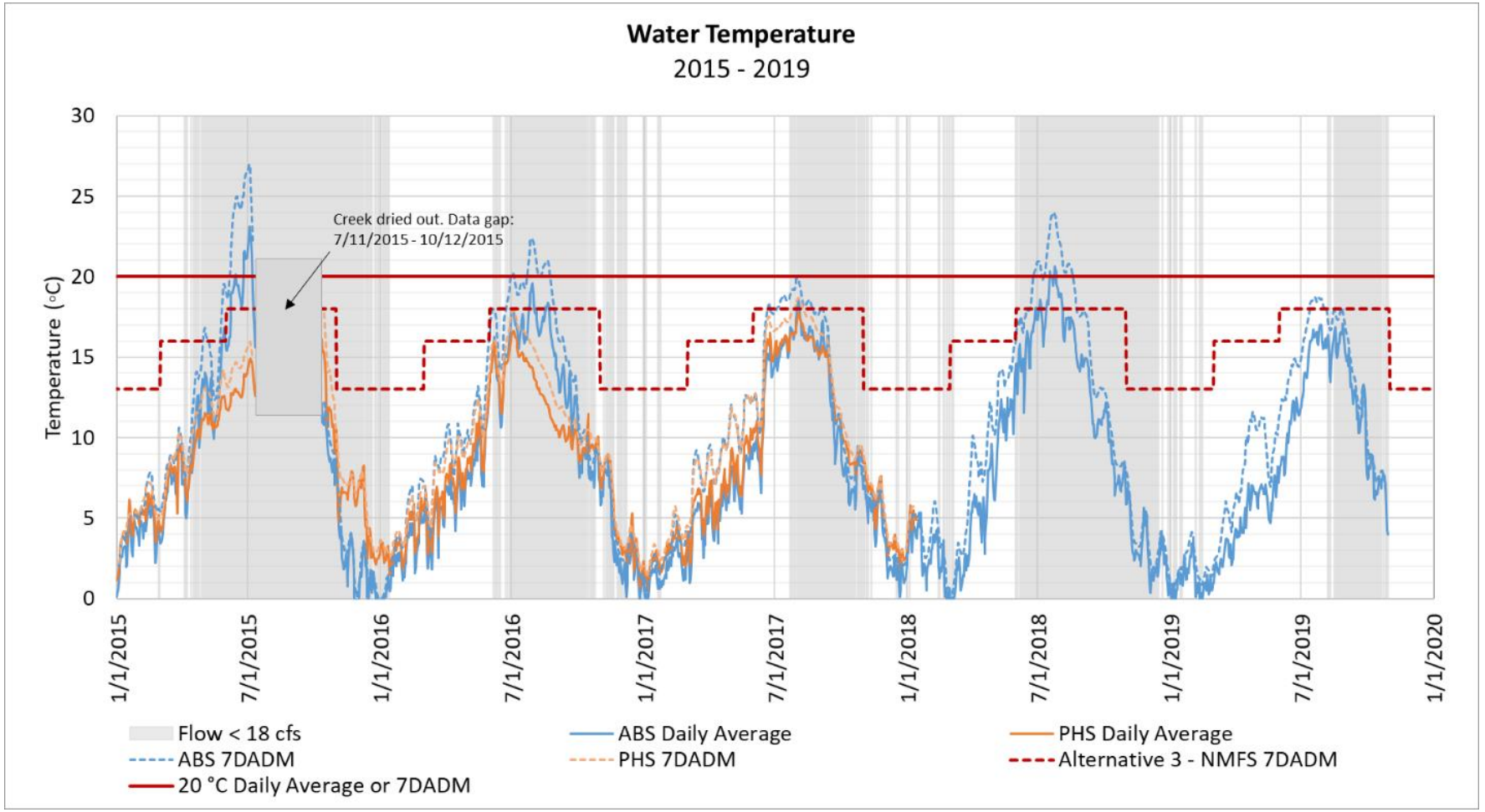

Figure 4.6–31. Water Temperature above Old Highway 36 Bridge Station (ABS) and at Powerhouse Falls (PH) 2015–2019 (shading indicates flow at ABS is <18 cfs and the Proposed Project would not be operating).

4.6.8 References

Adams, A.J., S.J. Kupferberg, M.Q. Wilber, A.P. Pessier, M. Grefsrud, S.Bobzien, V.T. Vredenburg. 2017. Extreme drought, host density, sex, and bullfrogs influence fungal pathogen infection in a declining lotic amphibian. Ecosphere, Vol 8, Issue 3. March 20, 2017.

Allen, M. A., and T.J. Hassler. 1986. Species profiles: life histories and environmental requirements of coastal fishes and invertebrates (Pacific Southwest) Chinook salmon. U.S. Fish Wildl. Serv. Biol. Rep. 82(11.49). U.S. Army Corps of Engineers, TR EL–82–4. 26 pp.

Barnhart, R.A. 1986. Species profiles: Life histories and environmental requirements of coastal fishes and invertebrates (Pacific Southwest) – steelhead. (Biological Report 82[11.60], TR EL–82–4.). Prepared for U.S. Fish and Wildlife Service, Washington, D.C., and the U.S. Army Corps of Engineers, Vicksburg, MS.

CDFW (California Department of Fish and Wildlife). 2016. Preliminary Comments and Recommendations Rugraw, LLC's Application for New Major License Lassen Lodge Hydroelectric Project (Project), Federal Energy Regulatory Commission (FERC) No. 12496–002, Tehama County

Cramer, S.P. and K. Ceder. 2013. Stream flows and potential production of spring–run Chinook salmon and steelhead in the Upper South Fork of Battle Creek, California. Prepared by Cramer Fish Sciences. Prepared for Tetra Tech.

Cramer, S.P., K. Sellheim, P.J. Haverkamp, K. Ceder, and J. Simonis. 2015. Lassen Lodge hydroelectric project fish habitat survey and capacity modeling final report, South Fork Battle Creek. Prepared for Rugraw, LLC. Revision No. 2.

CVRWQCB (California Regional Water Quality Control Board, Central Valley Region). 2018. The Water Quality Control Plan (Basin Plan) for the California Regional Water Quality Control Board, Central Valley Region, Fifth Edition, Revised May 2018 (with Approved Amendments), The Sacramento River Basin and the San Joaquin River Basin. Available at: www.waterboards.ca.gov

DPA (Douglas Parkinson and Associates). 1996. California Red–Legged Frog Survey Report, Battle Creek. August 20.

DPA. 1998. Progress Report, Red–Legged Frog Surveys, South Fork Battle Creek, Lassen Lodge Power Project (FERC# 11157). Prepared for Rugraw, Inc. March 4.

EPA (United States Environmental Protection Agency) 2003. EPA Region 10 Guidance for Pacific Northwest State and Tribal Temperature Water Quality Standards. Region 10 Office of Water. EPA 910–B–03–002. April.

Federal Energy Regulatory Commission (FERC). 2018. Final Environmental Impact Statement for Hydropower License, Lassen Lodge Hydroelectric Project – FERC Project No. 12496–002 – California. July.

Gowan, C. and K.D. Fausch. 1996. Mobile brook trout in two high–elevation Colorado streams: re–evaluating the concept of restricted movement. Can. J. Fish. Aquat. Sci. 53: 1370–1381.

Graf, P. 2007. The movement behaviors of a non–native trout in the Truckee River, CA. Unpublished Master's Thesis. University of Nevada, Reno.

Hilderbrand, R.H. and J.L. Kershner. 2000. Movement Patterns of Stream–Resident Cutthroat Trout in Beaver Creek, Idaho–Utah. Transactions of the American Fisheries Society 129:1160–1170.

Hokanson, K. E. F., Kleiner, and T. W. Thorslund. 1977. Effects of sonstant temperatures and diel temperature fluctuations on specific growth and mortality rates and yield of juvenile rainbow trout, Salmo gardneri. J. Fish. Res. Board Can. 34: 639–648.

Hunter, Mark A. 1992. Hydropower Flow Fluctuations and Salmonids: A Review of the Biological Effects, Mechanical Causes, and Options for Mitigation. State of Washington Department of Fisheries. Technical Report no. 119. wdfw.wa.gov

Interior (U.S. Department of the Interior). 2018. Department of the Interior comments on the FERC "Notice of Availability of the Draft Environmental Impact Statement for the Lassen Lodge Hydroelectric Project and Intention to Hold Public Meetings." Federal Energy Regulatory Commission Project No. 12496–002, Tehama County, CA. 20180202–5156. Available at: https://ferc.gov/docs– filing/elibrary.asp February 2, 2018.

Jenkins, Jr, T.M., S. Diehl, K.W. Kratz, and S.D. Cooper. 1999. Effects of Population Density on Individual Growth of Brown Trout In Streams. Ecology, 80(3)941–956.

Jones & Stokes. 2005. Battle Creek Salmon and Steelhead Restoration Project Final Environmental Impact Statement/Environmental Impact Report. Volume I: Report. July (J&S 03035.03.). Sacramento, California.

Kupferberg, Sarah; Alessandro Catenazzi; Mary Power. (University of California, Berkeley). 2011. The Importance of Water Temperature and Algal Assemblage for Frog Conservation in Northern California Rivers with Hydroelectric Projects. California Energy Commission. Publication number: CEC–500–2014–033.

Moyle, P.B. 1976. Inland Fishes of California. University of California Davis.

Moyle, P.B. 2002. Inland Fishes of California. University of California Press: Berkeley, CA.

NHC (Northwest Hydraulic Consultants). 2015. Sediment Transport Analyses for South Fork Battle Creek. Lassen Lodge Hydroelectric Project (FERC No. 12496). Prepared for Rugraw, LLC. Redding, CA.

NMFS (National Marine Fisheries Service). 2016. United States Department of Commerce's, National Oceanic and Atmospheric Administration's Fisheries Service, West Coast Region, Federal Power Act COMMENTS, Preliminary §18 PRESCRIPTIONS, §10(j) CONDITIONS, and §10(a) RECOMMENDATIONS for the Lassen Lodge Hydroelectric Project, Federal Energy Regulatory Commission Project No. 12496–002, located on South Fork Battle Creek, California.

NMFS. 2018. Letter dated April 5, 2018 from B.A. Thom, Regional Administrator, NMFS, to K.D. Bose, Secretary, FERC)

NMFS. 2019. March 13, 2019 Concurrence Letter to FERC.

Olson, F.W. 1990. Downramping regime for power operations to minimize stranding of salmonid fry in the Sultan River. FERC Project No. 2157. Prepared by CH2M Hill for Public Utility District No. 1 of Snohomish County, Everett, WA.

Parkinson, D, and Associates and Rugraw, LLC, 2014. Upper South Fork Battle Creek Base Streamflow Study, September 2014, November 1, 2014. 40 pp

Payne, Thomas & Eggers, Steven & Parkinson, Douglas. (2004). The number of transects required to compute a robust PHABSIM habitat index. Hydroécologie Appliquée. 14. 2004 10.1051/hydro: 2004003.

Placer County Water Agency (PCWA 2010). AQ 1 –Instream Flow Technical Study Report. Placer County Water Agency Middle Fork American River Project (FERC No. 2079)

PCWA 2011. AQ 5 –Bioenergetics Technical Study Report. Placer County Water Agency Middle Fork American River Project (FERC No. 2079)

Reclamation (U.S. Bureau of Reclamation), BLM, and Western Shasta Resource Conservation District. 2006. Draft Action Specific Implementation Plan: Lower Clear Creek Floodway Rehabilitation Project–Phase 3B.

Rodriquez, M.A. 2002. Restricted movement in stream fish: the paradigm is incomplete, not lost. Ecology: 83(1):1–13.

Rugraw. 2014. Lassen Lodge FERC application for license. Rugraw, LLC. Redding, California.

Sellheim, K. and S.P. Cramer. 2013. Lassen Lodge Hydropower Project: Salmonid habitat assessment for upper South Fork Battle Creek. Cramer Fish Sciences, Contract report submitted to Tetra Tech, Bothell, WA. 43 pp.

State Water Board (State Water Resources Control Board). 2018. Comments on the Lassen Lodge Hydroelectric Project Draft Environmental Impact Statement.

Tetra Tech. 2015a. Water Quantity and Quality Technical Study, Lassen Lodge Hydroelectric Project FERC No. 12496, South Fork Battle Creek, Tehama County, California. Revision 1. Prepared for Rugraw, LLC.

Tetra Tech. 2015b. Exhibit E, Appendix B, Biological Assessment Environmental Report Revision 1. Updated to reflect final Diversion/Intake structure dimensions, Alternative Transmission Line Route, Agency Consultation and additional environmental consultant report findings.

Tetra Tech. 2015c. California Red–legged Frog Site Assessment, Lassen Lodge Hydroelectric Project, FERC No. 12496, South Fork Battle Creek, Tehama County, CA. November.

United States Environmental Protection Agency (EPA). 2003. EPA Region 10 Guidance for Pacific Northwest State and Tribal Temperature Water Quality Standards. EPA 910–B–03–002. Region 10 Office of Water, Seattle, Washington. nepis.epa.gov

USGS. 2017a. USGS 11381500 Mill Creek near Los Molinos, California. Available at: waterdata.usgs.gov.

USGS. 2017b. USGS 11383500 Deer Creek near Vina, California. Available at: waterdata.usgs.gov.

Vredenburg, V.T., R.A. Knapp, T.S. Tunstall, C.J. Briggs. 2010. Dynamics of an emerging disease drive large–scale amphibian population extinctions. Proceedings of the National Academy of Sciences; 107 (21) 9689–9694 (May 25, 2010).

Watercourse Engineering. 2015. Water Temperature Model Development and Application: South Fork Battle Creek, Lassen Lodge Hydroelectric Project (FERC No. 12496), Final Report. Prepared for Rugraw, LLC.

Whitton, K.S., J.M. Newton, and M.R. Brown. 2010. Battle Creek fish community structure prior to largescale restoration, November 2007 to September 2008. U.S. Fish and Wildlife Service Report, Red Bluff Fish and Wildlife Office, Red Bluff, CA.

Yarnell, Sarah, Ryan Peek, Gerhard Epke, and Amy Lind. 2016. Management of the Spring Snowmelt Recession in Regulated Systems. Journal of the American Water Resources Association, 52(3), 723–736. doi.org

4.7 Biological Resources – Terrestrial

This section addresses potential impacts to terrestrial biological resources that could result from construction, operation, and maintenance of the Proposed Project. Where applicable, mitigation measures have been identified for significant impacts.

4.7.1 Environmental Setting

The Proposed Project is located 1.5 miles west of Mineral, California, on South Fork Battle Creek in Tehama County from approximately 3,350 to 4,310 feet above mean sea level (amsl). The Proposed Project is mostly located on privately owned land, with the exception of a 1.5–mile section of the proposed transmission line, which is within a county right–of–way.

4.7.1.1 Vegetation Communities and Wildlife Habitats

Vegetation communities present within the Proposed Project area were mapped by Dittes and Guardino Consulting in March 2013 through detailed review of aerial photographs and field spot–checks. As shown in Table 4.7–1 below, 21 communities and land use types were mapped.

Table 4.7–1. Vegetation Communities Present within the Proposed Project Area

Vegetation Community	Acres
Annual Grassland	**63.1**
Agricultural	
Irrigated Hayfield	3.30
Old Orchard	0.52
Blue Oak Woodland Communities	
Blue Oak/Foothill Pine/Interior Live Oak	37.01
Blue Oak Woodland	32.47
Chaparral	
Masticated Woodland	6.55
Mixed Chaparral	19.67
Montane Chaparral	59.49
Disturbed/Developed	
Disturbed	5.58
Himalayan Blackberry (*Rubus armeniacus*)	2.08
Residential/Developed	2.13
Road	6.90
Montane Hardwood Communities	
Montane Hardwood	15.26
Montane Hardwood/Conifer	75.64

Vegetation Community	Acres
Ponderosa Pine and Plantation	
Plantation	23.87
Ponderosa Pine	16.89
Riparian and Wetland	
Riparian	2.49
Riverine/Montane Riparian	3.85
Wetland	0.07
Rock	5.07
Sierran Mixed Conifer	347.98
Total Acres:	**729.92**

Source: Tetra Tech 2015c

A high–intensity fire burned extensive portions of the Proposed Project area in the summer of 2012. Portions of many of the vegetation communities within the Proposed Project area, including blue oak woodland, chaparral, montane hardwood, ponderosa pine and pine plantation, riparian, and Sierran mixed conifer forest, were impacted by this fire. The fire was of such high intensity in some areas that very few if any live standing trees or shrubs remained and the understory was burned down to mineral soil. The vegetation descriptions below, therefore, describe the more intact areas of each of the impacted vegetation communities.

Annual Grassland

The annual grassland vegetation type is primarily found in the western portion of the Proposed Project area. This vegetation community is typically dominated by non–native annual grasses and forbs, although the species composition in this vegetation type does vary to some degree by setting, soil, and adjacent vegetation communities. Deeper more productive soils are dominated by non–native annual grasses including wild oats (*Avena* spp.), foxtail barley (*Hordeum murinum*), rattail six weeks grass (*Festuca myuros*), annual dogtail (*Cynosurus echinatus*), medusa head (*Elymus* [*Taeniatherum*] *caput–medusae*), and several species of brome, including soft brome (*Bromus hordeaceus*), cheatgrass (*Bromus tectorum*), and ripgut brome (*Bromus diandrus*). Native and non–native forbs commonly found in these communities include dove weed (*Croton setigerus*), filaree (*Erodium* spp.), and rose clover (*Trofolium hirtum*). Yellow star thistle (*Centaurea solstitialis*), considered a noxious weed, is also common and abundant in annual grasslands in the Proposed Project area. Annual grassland vegetation found on rocky, shallow soils in the central portion of the Proposed Project area tends to be more diverse and support a higher proportion of native plant species. Annual grasses in these areas still tend to be dominated by non–native species, such as rattail sixweeks grass, soft brome, cheatgrass, and nit grass (*Gastridium phleoides*). In addition to the species noted above, native and non–native forbs found in these areas include lotus (*Acmispon* spp.), purple clarkia (*Clarkia purpurea* ssp. *quadrivulnera*), slender cottonweed (*Micropus californicus*), California knotweed (*Polygonum californicum*), bluedicks (*Dichelostemma capitatum* spp. *capitatum*), harvest brodiaea (*Brodiaea elegans* ssp. *elegans*), pink grass (*Petrorhagia dubia*), and filaree. Many of

the non–native annual grasses and forbs observed in the annual grassland vegetation community are listed noxious weeds.

Rock

Areas mapped as rock include areas of exposed bedrock, loose talus, and boulder fields. These areas are primarily unvegetated. Rock areas are found primarily along the transmission line right–of–way in the eastern and central portions of the Proposed Project area.

Agricultural

Areas mapped as agricultural include irrigated hayfields and an old orchard. These agricultural areas are located on the west end of the Proposed Project area near the town of Manton.

Blue Oak Woodland

Blue oak woodland vegetation communities include those mapped as blue oak/foothill pine/interior live oak and blue oak woodland. The blue oak/foothill pine/–interior live oak vegetation community occurs in scattered patches in the western portion of the Proposed Project area, with the largest stands in the northwest corner of the Proposed Project area. This vegetation community consists of a dense canopy of interior live oak (*Quercus wislizenii*) with scattered black oak (*Quercus kelloggii*), blue oak (*Quercus douglasii*), and emergent gray pine (*Pinus sabiniana*) trees. A few ponderosa pine (*Pinus ponderosa*) trees also occur in this community, especially on the south side of Hazen Road. Shrubs in this community include those shared by the surrounding/ intergrading mixed chapparal community. Non–native annual grasses, such as wild oats, species of brome (*Bromus* spp.), and annual fescues (*Festuca* spp.), occur in the understory and occupy gaps in this community. The blue oak woodland community also occurs in the western portion of the Proposed Project area and intergrades with annual grassland, blue oak–foothill pine–interior live oak and mixed chaparral communities. This community is dominated by blue oak with scattered gray pine and black oak trees. Scattered scrub species include buck brush (*Ceanothus cuneatus*) and other shrubs common in the adjacent mixed chaparral community.

Chaparral

Chaparral vegetation types found in the Proposed Project area include mixed chaparral, montane chaparral, and masticated woodland. The mixed chaparral vegetation community is primarily found in scattered patches in the western portion of the Proposed Project area.

Mixed chaparral communities exist in a mosaic pattern and intergrade with the surrounding woodland and hardwood–conifer forest communities. This community is characterized by a predominance of shrub species and is distinguished from the surrounding woodlands by a sparse or absent tree canopy. Dominant shrubs in this community include deer brush (*Ceanothus integerrimus*), scrub oak (*Quercus berberidifolia*), whiteleaf manzanita (*Arctostaphylos manzanita*), sticky whiteleaf manzanita (*A. viscida*), buck brush, hollyleaf redberry (*Rhamnus ilicifolia*), poison oak (*Toxicodendron diversilobum*), fragrant sumac (*Rhus aromatic*), redbud (*Cercis occidentalis*), mountain mahogany (*Cercocarpus betuloides*) and yerba santa (*Eriodictyon californicum*). Similar to adjacent oak woodland communities, annual grasses such as wild oats, and annual bromes and fescues, occupy gaps and the understory in this community. A portion of the mixed chaparral vegetation type along Hazen Road in the

western portion of the Proposed Project area was masticated during the 2012–2013 growing season, although there are some mature shrubs that have been left along the road edges.

The montane chaparral vegetation community is primarily found in the western and central portions of the Proposed Project area. The montane chaparral vegetation community tends to be less diverse than mixed chaparral and in portions of the Proposed Project area buck brush and yerba santa can form dense, almost homogenous stands. Other shrub and scattered tree species found in this vegetation community include interior live oak, Oregon white oak (*Quercus garryana* var. *breweri*), scrub oak, redbud, and mountain mahogany.

Disturbed and Developed

Areas mapped as developed include residential–developed areas and existing paved roads on the west end of the Proposed Project area near the town of Manton. Areas mapped as disturbed are associated with areas disturbed for timber harvesting activities on SPI land. Also included in this category is an area of dense Himalayan blackberry (*Rubus armeniacus*) in the west–central portion of the Proposed Project area near Soap Creek. This area consists of a dense thicket of predominantly Himalayan blackberry, a noxious weed ranked as “high” by the California Invasive Plant Council (Cal–IPC). Another non–native blackberry, cutleaf blackberry (*Rubus laciniatus*), was also common in this area.

Montane Hardwood

Montane hardwood vegetation communities are found scattered throughout the Proposed Project area, with the exception of the eastern edge of the Proposed Project area adjacent to South Fork Battle Creek. The montane hardwood category includes vegetation communities mapped as montane hardwood and montane hardwood–conifer. The canopy of the montane hardwood–conifer community consists of a mix of various conifer and oak trees. Ponderosa pine is the dominant conifer in this community. Gray pine, Douglas fir (*Pseudotsuga menziesii*), and incense cedar (*Calocedrus decurrens*) trees may also occur in this community. Oak trees commonly found in this community include black oak, canyon live oak (*Quercus chrysolepis*), and interior live oak. Openings and gaps in the canopy of this vegetation community support shrub species found in the mixed chaparral vegetation community such as manzanita, deer brush, and scrub oak. The montane hardwood vegetation community is differentiated from the montane hardwood–conifer community by the lack of conifer trees. Canyon live oak is the dominant tree species found in montane hardwood vegetation communities. Interior live oak is also a common component in the montane hardwood community. Understories in these communities are poorly developed with sparse shrub and herbaceous layers.

Ponderosa Pine

Ponderosa pine vegetation communities are found in scattered patches in the Proposed Project area. Areas mapped as ponderosa pine are located in the central and western portions of the Proposed Project area. Ponderosa pine is the dominant tree species in this community with black oak typically being a sub–dominant. Buck brush is the most abundant shrub species in the ponderosa pine community in the Proposed Project area. Four small ponderosa pine plantations also occur in the Proposed Project area, including one in the eastern portion of the Proposed Project area along the pipeline alignment, two in the central portion of the Proposed Project area, and one in the west–central portion of the Proposed Project area. These areas consist

almost exclusively of a ponderosa pine canopy, although the plantation in the west–central portion of the Proposed Project area was heavily burned in 2012. The understory in these plantations includes abundant patches of non–native species such as cheatgrass, bull thistle (Cirsium vulgare), and common mullein (*Verbascum thapsus*). The west–central plantation also includes heavy patches of yellow star thistle and rattail sixweeks grass.

Riparian

Riparian vegetation communities include those mapped as riparian and riverine–montane riparian. Riparian areas are found along: 1) Soap Creek; 2) an unnamed perennial stream channel in the western portion of the Proposed Project area; and 3) two intermittent channels in the west–central portion of the Proposed Project area. Refer to Table 4.7–2, below, for the acres/linear feet of stream habitats in the Proposed Project area.

Table 4.7–2. Acres/Linear Feet of Stream Habitats in the Proposed Project Area

Stream Type	Acres	Linear Feet
Perennial	1.82*	4,515
Intermittent	0.62	6,727
Ephemeral	0.05	1,065
Total	**2.49***	**12,307**

Source: Dittes and Guardino Consulting. March 2013

Vegetation in areas classified as riparian includes interior live oak, canyon live oak, California bay (*Umbellularia californica*), white alder (*Alnus rhombifolia*), bigleaf maple (*Acer macrophyllum*), California blackberry (*Rubus ursinus*), Himalayan blackberry, bush chinquapin (*Chrysolepis sempervirens*), and a few scattered willows (*Salix* spp.). Herbaceous vegetation is relatively sparse along Soap Creek and the unnamed perennial stream channel, although native and non–native species including yellow star thistle and rose clover, medusa head, annual dogtail, monkey flower (Mimulus spp.), and lady fern (*Athyrium filix–femina* var. *cyclosorum*) were some of the species observed in these areas. The overstory vegetation along both of the intermittent channels is relatively sparse. One of the intermittent channels (immediately west of Soap Creek) was in an area that was heavily burned in 2012 and very few live shrubs and trees remained during field surveys in 2013. Herbaceous vegetation along the intermittent channels includes monkey flower (*Mimulus* and *Diplacus* spp.), annual fescues (predominantly *Festuca myuros*), cheatgrass, velvet grass (*Holcus lanatus*), little quaking grass (*Briza minor*) yellow star thistle, bull thistle, scattered rushes (*Juncus* spp.), soft brome, and harvest brodiaea. Himalayan blackberry and cuttleaf blackberry were abundant along the southernmost of these two intermittent stream channels.

The riverine–montane riparian vegetation community is located in the eastern portion of the Proposed Project area and includes the vegetation associated with the floodplain of South Fork Battle Creek. Steep slopes and rocky soils prevent extensive riparian habitat from developing in much of this area. Although the canopy cover is partially comprised of the surrounding Sierran mixed conifer forest tree species, dominant woody species along the creek bed and bank itself include white alder with scattered willows. There are also occasional black cottonwood *(Populus trichocarpa*), Pacific dogwood (*Cornus nuttallii*), and big leaf maple trees. Other woody species

include thimbleberry, California blackberry, and California greenbrier (*Smilax californica*). Common herbaceous species include torrent sedge (*Carex nudata*), starflower (*Trientalis latifolia*), slender hairgrass (*Deschampsia elongata*), common mouseear chickweed (*Cerastium fontanum* ssp. *vulgare*), common horsetail (*Equisetum arvense*), blue wild rye (*Elymus glaucus* ssp. *glaucus*), mugwort (*Artemisia douglasiana*), fragile fern (*Cystopteris fragilis*), musk monkeyflower (*Mimulus moschatus*), English plantain (*Plantago lanceolata*), and American brooklime (*Veronica americana*).

Sierran Mixed Conifer Forest

The Sierran mixed conifer forest vegetation community is found in the eastern through central portions of the Proposed Project area. Sierran mixed conifer forest vegetation in the eastern portion of the Proposed Project area along the penstock and pipeline alignment is relatively intact, while much of this vegetation community in the central portion of the Proposed Project area was heavily burned in the summer of 2012. Additionally, much of the Sierran mixed conifer forest on private land within the Proposed Project area has been logged, including areas that have been clear–cut in the recent past. Disturbance by historic and ongoing logging activities, as well as post–fire debris cleanup activities, has been relatively high in many areas resulting in soil horizon displacement, barren substrates, and areas of downed wood. The Sierran mixed conifer forest community is dominated by varying mixes of white fir (*Abies concolor*), ponderosa pine, incense cedar, Douglas fir, and the occasional sugar pine (*Pinus lambertiana*). Canyon live oak, black oak, Oregon white oak, and bigleaf maple are also present, particularly at lower elevations and steeper positions in the eastern portion of the Proposed Project area. More mesic sites support a sub–canopy of mountain dogwood or redosier dogwood (*Cornus sericea* ssp. *sericea*), with scattered bigleaf maple. Common shrubs present in this community include several species of manzanita (*Arctostaphylos* spp.) and ceanothus (*Ceanothus* spp.), bush chinquapin, Utah serviceberry (*Amelanchier utahensis*), bitter cherry (*Prunus emarginata*), chokecherry (*Prunus virginiana*), poison oak (*Toxicodendron diversilobum*), Fremont's silk tassel (*Garrya fremontii*), snowberry (*Symphoricarpos* spp.), Sierra gooseberry (*Ribes roezlii* var. *roezlii*), and mountain pink currant (*Ribes nevadense*). Shrubs found in mesic sites include thimbleberry (*Rubus parviflorus*), wood rose (*Rosa gymnocarpa*), and redbud (*Cercis occidentalis*). Commonly encountered herbaceous species include bracken fern (*Pteridium aquilinum*), bitter dogbane (*Apocynum androsaemifolium*), slender–tube iris (*Iris tenuissima* ssp. *purdyiformis*), California harebell (*Asyneuma [Campanula] prenanthoides*), prince's pine (*Chimaphila menziesii*), rattlesnake plantain (*Goodyera oblongifolia*), white flowered hawkweed (*Hieracium albiflorum*), Sierra pea (*Lathyrus nevadensis* var. *nevadensis*), mountain sweet cicely (*Osmorhiza occidentalis*), trail plant (*Adenocaulon bicolor*), Indian warrior (*Pedicularis densiflora*), Sierra milkwort (*Polygala cornuta* ssp*. cornuta*), white veined wintergreen (*Pyrola picta*), Lemmon's catchfly (*Silene lemmonii*), and pine violet (*Viola lobata*). Common graminoids include many stemmed sedge (*Carex multicaulis*), Brainerd's sedge (*Carex brainerdii*), blue wild rye, woodland brome (*Bromus laevipes*), Orcutt's brome (*Bromus orcuttianus*), California needle grass (*Stipa occidentalis* var. *californica*), and awned melic (*Melica aristata*).

In many places where the forest is heavily stocked and the canopy closed, or where shrubs are very thick, the herbaceous understory is mostly lacking. Areas logged in the recent past also exhibit a fair amount of barren ground. The species composition and density of this vegetation type varies within the Proposed Project area. In some areas the canopy is dense and closed; in

others it is more open, with shrub species occupying the openings and edges. The boundary between the Sierran mixed conifer forest and montane hardwood conifer vegetation communities is diffuse in some areas, with the two types intergrading between one another.

Wetlands

Only one 0.07–acre wetland was observed during field surveys in 2013. This wetland was located at the top of one of the intermittent channels described above that leads into Soap Creek. This wetland is a small emergent wetland composed of a mix of non–native and native herbaceous species including monkeyflower (*Mimulus* spp.), velvet grass, spike bentgrass (*Agrostis exarata*), various species of rush (*Juncus* spp.), and scarlet pimpernel (*Anagallis arvensis*). Wetland and other water resources in the Proposed Project area are described in further in the Wetland Delineation Report prepared for the Proposed Project (Tetra Tech 2013).

Noxious Weeds

Noxious weeds include those identified by the California Department of Food and Agriculture and the Cal–IPC as having known ecological, environmental, or economic impacts.

Thirty–two noxious weeds were observed during field surveys in May, June, and September 2013. This includes 5 species ranked as “high” by Cal–IPC, 15 ranked as “moderate” and 12 ranked as “limited”. Locations of noxious weeds rated as “high” or “moderate” observed during field surveys of the Proposed Project area were mapped to the extent possible. Although noxious weeds were found in the majority of the Proposed Project area, the heaviest infestations were found in the western and west–central portions of the Proposed Project area along the transmission line right–of–way. Noxious weeds were most common in annual grassland and disturbed/developed habitats but were also observed in almost all vegetation communities in the Proposed Project area.

The most abundant and/or widespread noxious weeds observed in the Proposed Project area include yellow star thistle, Himalayan blackberry, medusa head, common wild oats (*Avena fatua*), bull thistle, annual dogtail, cheatgrass, and rattail sixweeks grass.

Special–Status Plants

For the purposes of this EIR, special–status plant species are those that fall into one or more of the following categories:

- Federally listed plant species granted status by the United States Fish and Wildlife Service (USFWS) under the Federal Endangered Species Act (ESA) include threatened (FT), endangered (FE), proposed threatened or endangered (FPT, FPE), candidate (FC), or listed species proposed for delisting (FPD).
- State of California listed plant species granted status by the California Department of Fish and Wildlife (CDFW) under the California Endangered Species Act (CESA) include state threatened (CT), endangered (CE), rare (CR) and California Species of Special Concern (CSC).
- California Native Plant Society (CNPS) listed plant species, which uses the following California Rare Plant Rank (CRPR) system for rare, threatened, or endangered plants in California:

- CRPR 1A – Plants presumed extirpated in California and either rare or extinct elsewhere
- CRPR 1B – Plants rare, threatened, or endangered in California and elsewhere
- CRPR 2A – Plants presumed extirpated in California, but common elsewhere
- CRPR 2B – Plants rare, threatened, or endangered in California, but common elsewhere
- CRPR 3 – Review List: Plants about which more information is needed
- CRPR 4 – Watch List: Plants or limited distribution
    - Threat Ranks:
        - 1 – Seriously threatened in California (more than 80 percent of occurrences threatened/high degree and immediacy of threat)
        - 2 – Moderately threatened in California (20to 80 percent of occurrences threatened/moderate degree and immediacy of threat)
        - 3 – Not very threatened in California (less than 20 percent of occurrences threatened/low degree and immediacy of threat or no current threats known)

A review of relevant literature, maps, and vegetation mapping of the Proposed Project area indicates potential habitat for several special–status plant species (Table 4.7–3).

The Proposed Project is within the range of one federally listed species, slender Orcutt grass (*Orcuttia tenuis*) which therefore may potentially occur in the Proposed Project area (Table 5–1; Appendix A in Tetra Tech 2015b). This species, however, is known to exist in vernal pools, a habitat type that is not currently documented in the Proposed Project area. Additionally, the Proposed Project is not located within designated critical habitat for slender Orcutt grass (USFWS 2013b in Tetra Tech 2015b).

No California state or federally listed plant species were observed during field surveys of the Proposed Project area conducted between 1996 and 2013. One CNPS list 4.3 (plant of limited distribution, not very threatened in California) species, Coleman's rein orchid (*Piperia colemanii*), was observed. Eight individuals of this species were observed in one location in the central portion of the Proposed Project area along the proposed transmission line route. These individuals were growing on a southwest facing slope in an area of second–growth Sierran mixed conifer forest that had been relatively heavily burned in the fires of 2012. The area had a fairly open canopy cover and a sparse shrub and herbaceous layer. Associated species include ponderosa pine, manzanita, canyon live oak, goosefoot violet (*Viola purpurea*), many flowered brodiaea (*Dichelostemma multiflorum*), bluedicks, three toothed horkelia (*Horkelia tridentata* ssp. *tridentata*), diamond petaled clarkia (*Clarkia rhomboidea*), slender birds beak (*Cordylanthus tenuis* ssp. *viscidus*), woolly sunflower (*Eriophyllum lanatum*), and Torrey's monkeyflower (*Mimulus torreyi*).

Table 4.7–3. Special–Status Plants Known to Occur or Potentially Occurring in the Proposed Project Area

Scientific Name Common Name	Status Federal/State/CNPS	California Distribution	Habitat Description	Blooming Period	Potential to Occur
Known to Occur in the Proposed Project Area					
Piperia colemanii Coleman's rein orchid	—/—/4.32	Scattered distribution along eastern Central Valley and foothills from Siskiyou County to Tulare County. Documented approximately 0.10 mile northwest of the Proposed Project area.	Chaparral and lower montane coniferous forest, often on sandy soils; 1,200 to 2300 meters (3,930 to 7, 545 feet).	Jun– Aug	Known to occur. Eight individuals of this species were observed during 2013 surveys in one location in the central portion of the Proposed Project area along the proposed transmission line route.
May Potentially Occur in the Proposed Project Area					
Allium sanbornii var. sanbornii Sanborn's onion	—/—/4.22	Cascade Range foothills and Sierra Nevada Foothills, from Shasta County to Calaveras County; Oregon. Documented approximately 0.75 mile north of Proposed Project alignment.	Gravelly or usually serpentine soils in chaparral, cismontane woodland, and lower montane coniferous forest; 260 to 1,510 meters (850 to 4,950 feet).	May–Sep	May occur in suitable habitat. Not observed during 2013 surveys. Documented approximately 0.75 mile north of Proposed Project alignment.

Scientific Name Common Name	Status Federal/State/CNPS	California Distribution	Habitat Description	Blooming Period	Potential to Occur
Calochortus syntrophus Callahan's mariposa lily	—/—/1B.1	Previously known from only fewer than five occurrences in Shasta County. Documented on private land approximately 0.75 mile west of the Proposed Project area.	Cismontane woodland, lower montane coniferous forest; vernally mesic valley and foothill grassland. 525 to 855 meters.	May–June	May occur in suitable habitat. Not observed during 2013 surveys. Documented on private land approximately 0.75 mile west of the Proposed Project area.
Chaemascyce ocellata ssp. rattanii Stony Creek spurge	—/—/1B.1	Northern Sacramento Valley in Colusa, Glenn, and Tehama counties.	Chaparral, sandy or rocky areas in valley and foothill grassland; 85 to 800 meters.	May–Oct	May occur in suitable habitat. Not observed during 2013 surveys. Occurs within 10–mile buffer, on the edge of buffer.
Clarkia gracilis ssp. albicaulis White–stemmed clarkia	—/—/1B.2	Southern Cascade Range foothills, Butte, Lake, and Tehama counties.	Chaparral, cismontane woodland, sometimes on serpentine soils; 245 to 1,085 meters (800 to 3,560 feet).	May–July	May occur in suitable habitat. Not observed during 2013 surveys.

Scientific Name Common Name	Status Federal/State/CNPS	California Distribution	Habitat Description	Blooming Period	Potential to Occur
Cryptantha crinita Silky cryptantha	—/—/1B.2	Shasta and Tehama counties.	Cismontane woodland, lower montane coniferous forest, riparian forest and woodland, valley and foothill grassland on gravelly streambeds; 61 to 1,215 meters (200 to 4,000 feet).	Apr–May	May occur in suitable habitat. Not observed during 2013 surveys.
Didymodon norrisii Norris' beard moss	—/—/2B.2	Scattered occurrences in California: Contra Costa, Colusa, Humboldt, Lake, Los Angeles Madera, Monterey, Nevada, Plumas, San Benito, Santa Cruz, Sierra, Shasta, Sonoma, Tehama, Tulare, and Tuolumne counties; Oregon.	Intermittently wet areas in rock outcrops in cismontane woodland, lower montane coniferous forest; 600 to 1,973 meters (1,970 to 6,475 feet).	—— (moss)	May occur in suitable habitat. Not observed during 2013 surveys.

Scientific Name Common Name	Status Federal/State/CNPS	California Distribution	Habitat Description	Blooming Period	Potential to Occur
Fritillaria eastwoodiae Butte County fritillary	—/—/3.22/	Sierra Nevada Foothills, from Shasta to El Dorado counties; Documented from Lyonsville 7.5. Quadrangle; the nearest known occurrence is approximately 0.12 mile northwest of Proposed Project area.	Chaparral, cismontane woodland, openings in lower montane coniferous forest, sometimes on serpentine; 50 to 1,500 meters (165 to 4,920 feet).	Mar–June	May occur in suitable habitat. Not observed during 2013 surveys. Documented from Lyonsville 7.5. Quadrangle; the nearest known occurrence is approximately 0.12 mile northwest of Proposed Project area.
Gratiola heterosepala Bogg's lake hedge–hyssop	—/CE/1B.2	Inner North Coast Ranges, Central Sierra Nevada Foothills, Sacramento Valley and Modoc Plateau: Fresno, Lake, Lassen, Madera, Merced, Modoc, Placer, Sacramento, Shasta, Siskiyou, San Joaquin, Solano, and Tehama counties; also Oregon.	Clay soils in areas of shallow water, lake margins of swamps and marshes, vernal pool margins; 10 to 2,375 meters (30 to 7,800 feet).	Apr–Aug	May occur in suitable habitat. Not observed during 2013 surveys.

Scientific Name Common Name	Status Federal/State/CNPS	California Distribution	Habitat Description	Blooming Period	Potential to Occur
Horkelia daucifolia var. indicta Jepson's horkelia	—/—/1B.1	Known from fewer than five occurrences in northern Sacramento Valley in Shasta and Tehama counties.	Quaternary pyroclastic flows, clay, volcanic, vernally mesic, openings in Cismontane woodland; 240 to 670 meters (780 to 2,200 feet).	Apr–June	May occur in suitable habitat. Not observed during 2013 surveys.
Juncus digitatus Finger rush	—/—/1B.1	Known from only two occurrences in Shasta County (including one just west of Shingletown); additionally recently found in Nevada County.	Openings in cismontane woodland and lower montane coniferous forest, xeric sites in vernal pools: 660 to790 meters (2,165 to 2,600 feet).	(Apr)[34] May–June	May occur in suitable habitat. Not observed during 2013 surveys.
Juncus leiospermus var. leiospermus Red bluff dwarf rush	—/—/1B.1	Northern Sacramento Valley and Cascade Range foothills with occurrences in Butte, Placer, Shasta, and Tehama counties.	Seasonally wet areas in chaparral, cismontane woodland, meadows and seeps, valley and foothill grassland, vernal pools; 35 to 1,020 meters (115 to to 3,350 feet).	Mar–May	May occur in suitable habitat. Not observed during 2013 surveys.

[34] Per the California Native Plant Society, "Months in parentheses are uncommon".

Scientific Name Common Name	Status Federal/State/CNPS	California Distribution	Habitat Description	Blooming Period	Potential to Occur
Limnanthes floccosa ssp. floccosa woolly meadowfoam	—/—/4.22/	Northern Sacramento Valley and Cascade Range foothills, from Siskiyou County to Butte County; Oregon. Nearest known occurrences is approximately 1.5 miles southeast of the Proposed Project area	Seasonally wet areas in chaparral, oak woodland openings, Valley and foothill grassland, vernal pools; 60 to 1095 meters (195 to 3,600 feet).	Mar–May(Jun)	May occur in suitable habitat. Not observed during 2013 surveys. Nearest known occurrences is approximately 1.5 miles southeast of the Proposed Project area
Orcuttia tenuis Slender Orcutt grass	FT/CE/1B.1	Sierra Nevada and Cascade Range foothills from Siskiyou to Sacramento counties. Known occurrences from Tehama County.	Vernal pools; 35 to 1,760 meters (115 to 5,775 feet).	May–Sep(Oct)	Vernal pools are not currently known within the Proposed Project area. However, vernal pools may be present in previously unsurveyed portions of the Proposed Project area.
Paronychia ahartii Ahart's paronychia	—/—/1B.1	Northern Central Valle in Butte, Shasta, and Tehama counties.	Cismontane woodland, valley and foothill grassland, vernal pools; 30 to 510 meters (100 to 1,673 feet).	Mar–Jun	May occur in suitable habitat. Not observed during 2013 surveys.

Scientific Name Common Name	Status Federal/State/CNPS	California Distribution	Habitat Description	Blooming Period	Potential to Occur
Rhynchospora capitellata Brownish beaked–rush	—/—/2B.2	Scattered occurrences in Northwestern California and northern Sierra Nevada Foothills. Known occurrences from Tehama County.	Wet areas in lower and upper montane coniferous forest, meadows and seeps, freshwater marshes and swamps; 45 to 2,000 meters (145 to 6,560 feet).	Jul–Aug	May occur in suitable habitat. Not observed during 2013 surveys.
Rupertia hallii Hall's rupertia	—/—/1B.2	Sierra Nevada Foothills in Butte and Tehama counties.	Cismontane woodland, lower montane coniferous forest, sometimes on disturbed soils often on roadsides and sometimes in openings and logged forests; 545 to 2,250 meters (1,790 to 7,380 feet).	June–Aug(Sep)	May occur in suitable habitat. Not observed during 2013 surveys.
Silene occidentalis ssp. longistipitata Long–stiped campion	—/—/1B.2	Southern high Cascade Range in Tehama, Butte, Plumas, and Shasta counties. Documented approximately 2.4 miles south of the Proposed Project area.	Chaparral, upper and lower montane coniferous forest; 1,000 to 2,000 meters (3,280 to 6,560 feet).	June–Aug	May occur in suitable habitat. Not observed during 2013 surveys. Documented approximately 2.4 miles south of the Proposed Project area.

Scientific Name Common Name	Status Federal/State/CNPS	California Distribution	Habitat Description	Blooming Period	Potential to Occur
Stellaria obtusa Obtuse starwort	—/—/4.32/	North Coast Ranges, Cascade Range, northern and central Sierra Nevada, and Modoc Plateau: in Butte, Glenn, Humboldt, Lassen, Nevada, Plumas, Shasta, Sierra, Tehama, and Tuolumne counties; Idaho, Oregon, Washington and elsewhere. Documented approximately 4.5 miles to the southeast of the Proposed Project area.	Mesic areas in lower and upper montane coniferous forest, riparian woodland; 150 to 2135 meters (490 to 7,005 feet).	May–Sep(Oct)	May occur in suitable habitat. Not observed during 2013 surveys. Documented approximately 4.5 miles to the southeast of the Proposed Project area.
Streptanthus longisiliquus Long–fruit jewelflower/Pit River jewel flower	—/—/4.32/	Butte, Tehama, Shasta counties. Previously documented in Proposed Project Area.	Rocky volcanic outcrops in lower montane coniferous forest; 745 to 1,340 meters (2,440 to 4,400 feet).	Apr–Sept	May occur in suitable habitat. Observed during 2002 surveys, but not documented in 2013.

Scientific Name Common Name	Status Federal/State/CNPS	California Distribution	Habitat Description	Blooming Period	Potential to Occur
Unlikely to Occur in the Proposed Project Area					
Betula glandulosa Dwarf Resin Birch	—/ —/2B.2	Cascade Range, Warner Mountains; also Oregon, Washington, and elsewhere. In California known from Butte, Lassen, Modoc, Plumas, Siskiyou, and Tehama counties.	Wet areas in bogs and fens, meadows and seeps, marshes and swamps, lower montane coniferous forest, subalpine coniferous forest; 1,310 to 2,300 meters (4,300 to 7,545 feet).	May–June	Unlikely to occur.
California macrophylla Round–leaved filaree	—/—/1B.1	Scattered occurrences in Great Valley, southern North Coast Ranges, San Francisco Bay Area and elsewhere in California. Known from Tehama County.	Cismontane woodland, valley and foothill grassland on clay soils; 15 to 1,200 meters (50 to 3,950 feet).	Mar–May	Unlikely to occur.
Clarkia borealis ssp. arida Shasta clarkia	—/—/1B.1	Cascade Range Foothills, Shasta and Tehama counties (near Shingletown).	In open grassy areas in oak woodland, lower montane coniferous forest; 490 to 595 meters (1,600 to 1,950 feet).	June–Aug	Unlikely to occur.

Special–Status Wildlife

For the purposes of this EIR, a special–status wildlife species is defined as any animal species that is granted status by a federal, state, or local agency, including:

- Federally listed species granted status by USFWS under the ESA include FT, FE, FPT, FPE, FC, or FPD. Also included are those species listed by USFWS as Birds of Conservation Concern (BCC) which include "species, subspecies, and populations of all migratory nongame birds that, without additional conservation action, are likely to become candidates for listing under the ESA of 1973" (USFWS 2008).
- State of California listed wildlife species which are granted status by the CDFW under the CESA include CT, CE, candidates for listing under CESA (CCT, CCE), Fully Protected species, and CSC.
- One additional species, the osprey (Pandion haliaetus [CDFW Watch List (WL)]), although not a special–status species, is included in this analysis because it is commonly associated with hydroelectric facilities in the state of California.

Rugraw identified special–status wildlife species that are known to occur or may occur within the Proposed Project area using desktop research, literature review, and field habitat assessments of Proposed Project lands in May, June, and September 2013. The 2013 field habitat assessments included a one–mile buffer around the Proposed Project facilities. Table 4.7–4 shows the status, habitat requirements, and likelihood of occurrence for each species that could occur within the Proposed Project lands.

A brief description of each special–status wildlife species known to occur or potentially occurring in the Proposed Project area, and the location of the species or its habitat in relation to the Proposed Project, is provided below.

Vernal Pool Fairy Shrimp (FT)

This small aquatic invertebrate occurs exclusively in vernal pool habitats in northern California and Oregon. It closely resembles at least four other species of fairy shrimp that occur in similar habitats and can be difficult to distinguish (USFWS, 2005).

Surveyors did not observe the vernal pool fairy shrimp during 2013 field surveys and documented no vernal pool habitat on Proposed Project lands. However, the species or its habitat may be present in previously unsurveyed portions of the Proposed Project area. USFWS designated critical habitat for the vernal pool fairy shrimp on August 6, 2003 (68 FR 46684), but Proposed Project lands do not contain critical habitat for this species. The nearest critical habitat unit is approximately 30 miles southwest of the Proposed Project site.

Table 4.7–4. Special–Status Wildlife Species Potentially Occurring on Proposed Project Lands

Species (*Scientific Name*)	Status	Habitat Requirements	Potential to Occur on Proposed Project Lands
Known to Occur in the Proposed Project Area			
Birds			
Osprey (*Pandion haliaetus*)	WL	Suitable habitat includes large trees, snags, cliffs, or structures near riparian or open water habitats.	Species was observed during 2013 surveys flying over the west end of the Proposed Project area near Manton, California. Nearest documented nesting location is approximately 3.5 miles north of the Proposed Project transmission line right–of–way, but suitable nesting habitat is present.
Northern goshawk (*Accipiter gentilis*)	CSC	Prefers subalpine and upper montane forests with relatively dense canopy closure and open understories	Species was not observed during 2013 surveys, but is has been previously documented and is known to occur within the Proposed Project vicinity (near Panther Creek).
Olive–sided flycatcher (*Contopus cooperi*)	CSC, BCC	Prefers forested habitats with large, tall trees overlooking open terrain, for nesting, roosting, and foraging	Species was observed during 2013 surveys in Sierran mixed conifer habitat atop cliffs above Panther Creek. Suitable habitat on Proposed Project lands includes any tall trees overlooking open terrain.
Oak titmouse (*Baeolphus inornatus*)	BCC	Preferred habitat includes oak dominated woodlands, chaparral, and riparian habitats.	Species was observed during 2013 surveys west of Soap Creek in a blue oak tree within montane chaparral habitat. Suitable habitat occurs on south–facing slopes in blue oak woodland and blue oak–foothill pine–interior live oak habitats within Proposed Project lands.

Species (*Scientific Name*)	Status	Habitat Requirements	Potential to Occur on Proposed Project Lands
Potentially Occurring in the Proposed Project Area			
Invertebrates			
Vernal pool fairy shrimp *Branchinecta lynchi*	FT	In California, range extends from Tulare County in the south to Shasta County in the north. Occurs primarily in vernal pools, seasonal wetlands, and stagnant ditches that fill with water during fall and winter rains and dry up in spring and summer.	No suitable habitat identified during 2018 surveys; however, habitat may be present in previously unsurveyed portions of the Proposed Project area.
Birds			
Calliope hummingbird (*Stellula calliope*)	BCC	Commonly feeds in montane chaparral and wet meadow habitats. Nests in woodlands or forests, often in a pine or montane riparian tree.	Species was not observed during 2013 surveys. Suitable feeding and nesting habitat occurs throughout much of the Proposed Project area.
Golden eagle (*Aquila chyrsaetos*)	California Fully Protected, BCC, Bald and Golden Eagle Protection Act (Eagle Act)	Nests on steep cliffs or in large trees and forages in grasslands and other open terrain habitats.	Species was not observed during 2013 surveys, but may forage in annual grasslands along the western end of the transmission line right–of–way. Potential nesting habitat is located on the south–facing cliffs across from the Proposed Project's eastern end, and foraging habitat may be provided by annual grasslands along the western end of the transmission line right–of–way.
Bald eagle (*Haliaeetus leucocephalus*)	CE, California Fully Protected, BCC, Eagle Act	This species nests in mature trees and snags and on cliffs, rocks, and artificial structures, generally within 1 mile of water. Forages over water and other open habitats. Nesting activity occurs from January through August.	Species was not observed during 2013 surveys, but may opportunistically use the Proposed Project area for foraging or roosting. Nearest known nest location is approximately 4.9 miles north of the transmission line right–of–way.

Species (*Scientific Name*)	Status	Habitat Requirements	Potential to Occur on Proposed Project Lands
Northern spotted owl (Strix occidentalis caurina)	FT, CT, CSC	Requires mature forest stands with large trees and snags. Prefers sites with both standing and fallen dead trees, and open space among the lower branches to allow flight under the canopy.	Species was not observed during 2013 surveys. Proposed Project lands do not contain high–quality habitat for this species. Mixed conifer patches along Battle Creek provide marginally suitable nesting habitat.
Lewis's woodpecker (*Melanerpes lewis*)	BCC	Suitable habitat includes open, deciduous and conifer habitats with scattered snags and live trees for nesting and perching. Uses logged and burned areas. Prefers oaks and acorns in winter	Species was not observed during 2013 surveys. Open, forested, logged, and burned areas within the Proposed Project area provide suitable wintering habitat. The Proposed Project area is outside this species' summer range.
Prairie falcon (*Falco mexicanus*)	WL, BCC	Suitable nesting habitat includes cliffs and bluffs. Foraging habitat consists of grasslands and other open terrain.	Species was not observed during 2013 surveys. Potential nesting habitat occurs on south–facing cliffs in the Proposed Project vicinity. Annual grasslands and fields at the western end of Proposed Project lands provide suitable foraging habitat.
American peregrine falcon (*Falco peregrinus anatum*)	California Fully Protected, BCC, Eagle Act	Occurs in mountain ranges, river valleys, and coasts, near wetlands, lakes, rivers, or other water. Nests on cliff banks, dunes, ledges, buildings, and artificial structures.	Species was not observed during 2013 surveys, but has been previously documented in the Proposed Project area. Suitable nesting habitat occurs in several areas along the south–facing slope ranging approximately 80 to 960 feet above the creek and consisting of a series of 20– to 100–foot–tall cliffs. Nearest mapped location is 5.25 miles south of the Proposed Project lands, east of Paynes Creek.
Cassin's finch (*Carpodacus cassinii*)	BCC	Nests in tall trees in open, montane coniferous forests and forages in nearby meadows or grasslands.	Species was not observed during 2013 surveys. Suitable habitat occurs throughout much of the Proposed Project area.

Species (*Scientific Name*)	Status	Habitat Requirements	Potential to Occur on Proposed Project Lands
Mammals			
Spotted bat (*Euderma maculatum*)	CSC	Roosts in crevices of cliffs, caves, and buildings. Foraging habitat includes grasslands and other open habitats near water.	Species was not observed during 2013. Suitable roosting habitat in the Proposed Project area includes south–facing cliffs and the steep north–facing slope between the Proposed Project bypassed reach and penstock/pipeline alignment. Suitable foraging habitat occurs throughout the Proposed Project area. Nearest documented occurrence is approximately 4.5 miles southeast of the Proposed Project
Sierra Nevada red fox (*Vulpes vulpes necator*)	FPE, CT	Occurs in high elevation (5,000 feet and higher) barren, conifer, and shrub habitats; montane meadows; and subalpine woodland. Potential den sites include natural cavities in talus slopes, rockslides, or boulder piles.	Species was not observed during 2013 surveys. The Proposed Project area is located below the expected elevation range for this species. A known population is present in the Lassen Peak area, in the vicinity of the Proposed Project. Nearest documented occurrence is approximately 3.2 miles east of the Proposed Project.
Unlikely to Occur in the Project Area			
Invertebrates			
Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*)	FT	USFWS defines habitat for the valley elderberry longhorn beetle as elderberry plants (*Sambucus* ssp) below 3,000 feet in elevation. Species is typically found within riparian habitats. May also occur in interior live oak and mixed oak woodlands, and chaparral in the Sierra Nevada foothills, in dry, rocky outcroppings of granite.	Proposed Project is above the elevation range for this species. Neither species nor host plant was observed during 2013 surveys. The nearest documented occurrence is approximately 5.7 miles southwest of the Proposed Project site. Proposed Project lands do not contain critical habitat for this species.

Species (*Scientific Name*)	Status	Habitat Requirements	Potential to Occur on Proposed Project Lands
Birds			
Flammulated owl (*Otus flammeolus*)	BCC	Occurs in coniferous habitats from ponderosa pine to red fir forests. Prefers low to intermediate canopy closure. Nests in cavities or woodpecker holes in aspen, oak, or pine snags or trees.	Species is not expected to occur in the project area. Proposed Project area is outside the elevation range for this species.
Western yellow–billed cuckoo (*Coccyzus americanus occidentalis*)	FPT, CE, CSC, BCC	Requires dense, wide, deciduous riparian forest with large areas of contiguous closed canopy and well–developed understories. Willows and cottonwoods are preferred. Requires low–elevation streams and rivers with unrestricted floodplains.	Species was not observed during field surveys and is not expected in the Proposed Project area due to elevation and a lack of well–developed riparian habitat.
Yellow–breasted chat (*Icteria virens*)	CSC	Inhabits early successional riparian habitats with a well–developed shrub layer and an open canopy. Nesting habitat is usually restricted to the narrow border of streams, creeks, sloughs, and rivers.	Species was not observed during field surveys and is not expected to occur in the Proposed Project area due to a lack of well–developed riparian shrub cover in riparian habitat.
Mammals			
Sierra Nevada snowshoe hare (*Lepus americanus tahoensis*)	CSC	Occurs in riparian communities characterized by thickets of deciduous trees and shrubs such as willows and alders, forest undergrowth, dense thickets of young conifers, and patches of chaparral.	Species was not observed during field surveys and is not expected to occur in the Proposed Project area due to its elevation range. The nearest documented occurrence is approximately 5 miles east of Proposed Project lands.
Wolverine (*Gulo gulo*)	FPT, CT	Occupies mixed conifer, red fir, and lodgepole pine habitats. Probably also uses subalpine conifer, alpine dwarf–shrub, wet meadow, and montane riparian habitats.	Species was not observed during field surveys and is not expected in the Proposed Project area due to elevation range. The nearest documented occurrence is 3.8 miles north of the Proposed Project transmission line right–of–way.

Species (*Scientific Name*)	Status	Habitat Requirements	Potential to Occur on Proposed Project Lands
Fisher (*Martes pennanti*)	FC, CT, CSC	Found in mid– to late–seral stage forest habitat with a predominately closed canopy and diversity of tree sizes and shapes, light gaps and associated understory vegetation, snags, fallen trees and limbs, and limbs close to the ground. Requires large areas of mature, dense forest.	Species was not observed during field surveys and is not expected in the Proposed Project area due to insufficient contiguous preferred habitat and lack of evidence for fisher presence between the Pit River in the norther Sierra/Cascades and the Merced River in the southern Sierra per the February 2010 status report. The nearest documented occurrence is approximately 11.5 miles northeast near Lassen Peak (historic).

Calliope Hummingbird (BCC)

The Calliope hummingbird breeds in wooded habitats from ponderosa pine and montane hardwood–conifer up through lodgepole pine, favoring montane riparian, aspen, and other open forests near streams. The Calliope hummingbird commonly feeds in montane chaparral and wet meadow habitats. It nests in woodlands or forests, often in a pine or montane riparian tree.

The Calliope hummingbird was not observed during surveys. Potential nesting habitat occurs in open forest near streams. Potential foraging habitat occurs in montane chaparral habitat present within the Proposed Project transmission line right–of–way.

Osprey (WL)

The osprey requires large, fish–bearing waters, primarily in ponderosa pine through mixed conifer habitats. Osprey occur in areas of large streams, rivers, lakes, reservoirs, bays, estuaries, and surf zones. This species uses large trees, snags, dead–topped trees, cliffs, or man–made structures in open forest habitats for cover and nesting, typically within 15 miles of a fish–producing body of water.

An osprey was observed flying over the west end of the Proposed Project area near Manton (see Figure 5–2, sheet 1 of 5 in FERC 2018). Osprey may nest in large trees, snags, and cliffs within the Proposed Project area because of the presence of large fish–bearing waters within 15 miles. The nearest CNDDB–mapped occurrence is approximately 3.5 miles north of the Proposed Project transmission line right–of–way.

Golden Eagle (California Fully Protected, BCC, Eagle Act)

Golden eagles inhabit a variety of habitats including forests, canyons, shrub lands, grasslands, and oak woodlands. Nests are constructed on platforms on steep cliffs or in large trees. The main prey species for the golden eagle are rabbits, hares, and rodents, although eagles may also prey on other mammals, birds, and reptiles. Carrion (e.g., carcasses found on the landscape) is also a part of the eagle diet, especially during the winter months. This species requires open terrain for hunting: grasslands, deserts, savannahs, and early successional stages of forest and shrub habitats.

The golden eagle was not observed during the surveys. Potential nesting habitat may occur on the south–facing cliffs across from the Proposed Project's eastern end, and foraging habitat may be provided by annual grasslands along the western end of the transmission line right–of–way.

Bald Eagle (CE, California Fully Protected, BCC, Eagle Act)

The bald eagle is typically found in lower montane coniferous forest and old growth. Coastlines, rivers, and large lakes are used for foraging. Nesting occurs in mature or old–growth trees, snags (dead trees), cliffs, and rock promontories. Bald eagles will also nest on artificial structures such as power poles and communication towers. Most nests are found within 1 mile of water.

No bald eagles were observed during field surveys. However, CDFW has observed bald eagles flying over the Proposed Project area at high altitude (CDFW 2013e in FERC 2018). This species is unlikely to nest in the Proposed Project area, and the few areas of potential foraging and winter roosting habitat along the creek offer only marginal foraging and roosting opportunities. Bald eagles may opportunistically use the area for roosting during construction.

The nearest documented nest location is approximately 4.9 miles north of the transmission line right–of–way, east of Manton, California, in Shasta County.

Northern Goshawk (CSC)

The northern goshawk occurs within subalpine and upper montane mature and old growth coniferous or coniferous–hardwood forest with relatively dense canopy closure and open understories. Large areas of contiguous habitat increase the probability of occupancy. The northern goshawk usually nests on north–facing slopes, near water. Red fir, lodgepole pine, Jeffrey pine, and aspens are typical nest trees.

The northern goshawk was not observed during surveys, but is known to occur within the Proposed Project vicinity near Panther Creek per coordination with Sierra Pacific Industries (SPI 2013). Upper montane mature forest occurs in the Proposed Project vicinity near Panther Creek.

Northern Spotted Owl (FT, ST)

This large owl species requires mature forest stands with large trees and snags. The northern spotted owl prefers sites with both standing and fallen dead trees, and open space among the lower branches to allow flight under the canopy. Threats to this species include loss of habitat and competition with the barred owl (*Strix varia*) (USFWS, 2011).

This species was not observed during 2013 field surveys. Proposed Project lands do not contain high–quality habitat for this species due to of historical logging and other disturbances, and lack of mature forest stands. However, mixed conifer patches along Battle Creek provide marginally suitable nesting habitat for this species. USFWS designated critical habitat for the northern spotted owl on January 15, 1992 (57 FR 1796) and revised the designation on August 13, 2008 (73 FR 47326). The designation includes portions of western Washington, Oregon, and California. Proposed Project lands do not contain designated critical habitat for this species. The nearest designated critical habitat is approximately 40 miles north–northwest of the Proposed Project area.

Lewis's Woodpecker (BCC)

Lewis's woodpecker is an uncommon, local winter resident occurring in open oak savannahs and broken deciduous and coniferous habitats. This species requires open habitats with scattered trees and snags with cavities. Lewis's woodpecker usually nests in snags or dead parts of live trees, including sycamore, cottonwood, oak, or conifer. Suitable habitat includes open, deciduous, and conifer habitats with brushy understory, and scattered snags and live trees for nesting and perching. Lewis's woodpecker uses logged and burned areas, and prefers oaks and acorns in winter.

Lewis's woodpecker was not observed during surveys. The Proposed Project area is outside of the summer range, but is located within the winter range. Potential wintering habitat occurs within the Proposed Project area in oak woodlands, open Sierran mixed conifer habitat that includes snags, and the logged and burned areas.

Prairie Falcon (WL, BCC)

The prairie falcon is distributed from annual grasslands to alpine meadows, but is associated primarily with perennial grasslands, savannahs, rangeland, some agricultural fields, and desert

scrub areas. The prairie falcon inhabits dry, open terrain that is either level or hilly. It usually nests in a scrape on a sheltered ledge of a cliff overlooking a large, open area. The prairie falcon sometimes nests on old raven or eagle stick nests on cliffs, bluffs, or rock outcrops.

The prairie falcon was not observed during the surveys. Potential nesting habitat may occur on south–facing cliffs in the Proposed Project vicinity. Potential foraging habitat includes annual grassland and fields on the western end of the Proposed Project.

American Peregrine Falcon (California Fully Protected, BCC, Eagle Act)

The American peregrine falcon is found in mountain ranges, river valleys, and coasts, near wetlands, lakes, rivers, or other water. The American peregrine falcon nests on cliff banks, dunes, mounds, rock and skyscraper ledges, tall towers, bridges, and rarely in tree cavities or old stick nests.

The American peregrine falcon was not observed during surveys. However, this species has been observed by SPI within the Proposed Project area in suitable habitat. Suitable nesting habitat occurs in several areas along the south–facing slope ranging approximately 80 to 960 feet above the creek and consisting of a series of 20– to 100–foot–tall cliffs. The nearest CNDDB–documented location is 5.25 miles to the south, east of Paynes Creek.

Olive–sided flycatcher (CSC, BCC)

Preferred nesting habitats for the olive–sided flycatcher include mixed conifer, montane hardwood– conifer, Douglas–fir, redwood, red fir, and lodgepole pine. This species is most numerous in montane conifer forests where tall trees overlook canyons, meadows, lakes, or other open terrain. The olive–sided flycatcher requires large, tall trees, usually conifers, for nesting and roosting sites; and lofty perches, typically the dead tips or uppermost branches of the tallest trees in the vicinity, for singing posts and hunting perches.

An olive–sided flycatcher was observed in a snag located in Sierran mixed conifer habitat atop cliffs above Panther Creek during surveys (see Figure 5–2, sheet 4 of 5 in FERC 2018). Habitat is present where tall trees overlook open terrain.

Oak Titmouse (BCC)

The oak titmouse forages on foliage, twigs, branches, and trunks as well as occasionally on the ground. Oak titmice forage on blue oak (*Quercus douglasii*), live oak (*Q. wislizenii*), and gray pine (*Pinus sabiniana*). Oak titmice prefer a woodland habitat in which oaks predominate, such as woodlands, oak savannah, open broad–leaved evergreen forests, and riparian woodlands. The open broad–leaved evergreen forest must be spacious, have oaks, and be on south–facing slopes. This species is associated with oak and pine–oak woodland, arborescent chaparral, and oak–riparian habitats.

Oak titmice were observed in a blue oak within montane chaparral habitat on a south–east facing slope west of Soap Creek within the Proposed Project area during survey. Suitable habitat occurs on south–facing slopes in blue oak woodland and blue oak–foothill pine–interior live oak habitats within the Proposed Project area.

Cassin's finch (BCC)

Cassin's finch occurs in tall, open coniferous forests in lodgepole pine, red fir, and subalpine conifer habitats. Cassin's finch is most numerous near wet meadows and grassy openings. This species prefers tall trees in open, montane coniferous forests for nesting and resting, and nearby grassy meadows or other openings for foraging.

Cassin's finch was not observed during surveys. Potential habitat exists within open coniferous forest with tall trees, although grassy meadows were not observed within the Proposed Project area.

Spotted Bat (CSC)

The spotted bat occurs in arid deserts, grasslands, and mixed conifer forests. Moths are the most common prey species.

Maternal roosts and hibernacula are found rock crevices but are occasionally found in caves and buildings. Cliffs provide optimal roosting habitat. Day roosts are commonly found in rock crevices, tree hollows, mines, caves, and a variety of man–made structures. Night roosts are usually more open sites and may include open buildings, porches, mines, caves, and under bridges.

Potential foraging habitat for the spotted bat occurs throughout the Proposed Project area. Habitat for maternal roosting or hibernacula in the form of rock crevices exists in south–facing cliffs across from the Proposed Project, and along the steep north–facing slope between the Proposed Project reach and penstock/pipeline alignment. The nearest documented occurrence is approximately 4.5 miles southeast of the Proposed Project area.

Sierra Nevada Red Fox (FPE, CT)

The Sierra Nevada red fox inhabits high–elevation and barren conifer and shrub habitats, montane meadows, subalpine woodlands, and fell–fields. Sightings in the Sierra Nevada range from 3,900 to 11,900 feet amsl, with most sightings occurring above 7,000 feet amsl. Den sites are described as natural cavities in talus slopes or rockslides. The Sierra Nevada red fox may use earthen dens, boulder piles, or even the space beneath vacant cabins for denning.

There is a known population of Sierra Nevada red foxes associated with the Lassen Peak area. This population is restricted to the region's highest elevations, occurring in areas 4,300 feet amsl and higher, and primarily within the western half of Lassen Volcanic National Park (approximately 15 miles west of the Proposed Project area).This species was not observed during field surveys. However, based on proximity of the known population, the species may potentially be present in the Proposed Project area. Dense shrub thickets and a lack of large trees with more than 40 percent canopy closure characterize most of the higher elevation portions of the Proposed Project, but potential denning habitat may exist in talus slopes and rockslides on the south–facing slope in the Proposed Project vicinity above the Proposed Project reach. Potentially suitable habitat was not identified within the Proposed Project area to be subject to ground disturbance. The nearest documented location is approximately 3.2 miles east.

4.7.2 Regulatory Setting

The following are relevant plans, policies, and ordinances that apply to aquatic and terrestrial biological resources.

4.7.2.1 Federal

Federal Endangered Species Act

The United States Congress passed the federal ESA in 1973 (16 U.S.C. section 1531 et seq.), as amended, and the implementing regulations (50 C.F.R. section 17.1 et seq.) are administered by the USFWS for most plant and animal species and by NMFS for certain marine species, to provide a means for listing and protecting endangered and threatened species and their designated critical habitats, if applicable.

Section 9 of the ESA and federal regulations pursuant to Section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without an exemption permit. “Take” under the ESA is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. “Harm” is further defined by USFWS to include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. “Harass” is defined by USFWS as intentional or negligent actions or omissions that create the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns that include, but are not limited to, breeding, feeding, or sheltering. “Incidental take” is defined as any take otherwise prohibited, if such take is incidental to, and not the purpose of, carrying out an otherwise lawful activity.

ESA Section 7 requires federal agencies to formally consult with USFWS and/or NMFS and obtain a biological opinion prior to carrying out any federal program or agency action that may adversely affect threatened or endangered species or may adversely modify designated critical habitat. The formal Section 7 consultation and biological opinion process includes an evaluation of whether a federal action is likely to jeopardize the continued existence of any endangered or threatened species or result in the “destruction or adverse modification” of critical habitat, and requires the inclusion of reasonable and prudent measures in the implementation of a project or agency action in order to minimize any impact (16 U.S.C. 1536).

Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act (16 U.S.C. sections 668–668(d)) is the primary law protecting bald and golden eagles. The Bald and Golden Eagle Protection Act prohibits anyone, without a permit issued by the Secretary of the Interior, from “taking” bald eagles, including their parts, nests, or eggs. “Take” under this statute is defined as to “pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, or molest or disturb.” “Disturb” is defined as “to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, (1) injury to an eagle, (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior” (50 C.F.R. section 22.3).

In addition to immediate impacts to individuals or occupied nests, the "take" definition also covers impacts from human alterations to an area around a previously used nest site during a time when eagles are not present, "if, upon the eagle's return, such alterations agitate or bother an eagle to a degree that interferes with or interrupts normal breeding, feeding, or sheltering habits, and causes injury, death or nest abandonment" (USFWS 2020).

In 2009, USFWS finalized a new rule that allows authorization of "take" of bald and golden eagles and eagle nests by issuing permits under the Bald and Golden Eagle Protection Act. Authorizations of limited take must include mitigation that will result in net benefits to the affected eagle species (74 C.F.R. sections 46836–46879).

Violating the Bald and Golden Eagle Protection Act can result in a fine of $100,000 ($200,000 for organizations) or imprisonment for one year, or both, for a first offense. Penalties increase substantially for additional offenses, and a second violation of this act is a felony.

Migratory Bird Treaty Act

The federal Migratory Bird Treaty Act (MBTA) of 1918, as amended (16 U.S.C. sections 703 – 712), protects migratory birds and their nests, eggs, young, and parts from possession, sale, purchase, barter, transport, import, export, and take. For purposes of the MBTA, take is defined as "to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to pursue, hunt, shoot, wound, kill, trap, capture, or collect" (50 C.F.R. section 10.12). The MBTA applies to migratory birds identified in 50 C.F.R. section 10.13. In general, the MBTA protects all birds occurring in the United States except for house (English) sparrow (*Passer domesticus*), European starlings (*Sturnus vulgaris*), rock doves (pigeons; *Columba livia*), any recently listed unprotected species in the Federal Register, and non–migratory upland game birds. The USFWS has regulatory authority over implementation and enforcement of the MBTA. For species listed under both the ESA and the MBTA, the USFWS has the authority to authorize incidental take with special terms and conditions under Section 10(a)(1)(B) of the ESA and have this permit also serve as a Special Purpose Permit under the MBTA (50 C.F.R. section 21.27). Special Purpose Permits are required in the event that an action would take, possess, or involve the sale or transport of birds protected by the MBTA.

4.7.2.2 State

California Endangered Species Act

The California Endangered Species Act (Fish and G. Code, section 2050 et seq.)(CESA), CDFW administers CESA, which prohibits the take of plant and animal species designated by the California Fish and Game Commission as endangered or threatened in the State of California. CDFW regulations are set forth in the California Fish and Game Code. Under CESA, take is defined as to "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill." CESA section 2053 stipulates that state agencies may not approve projects that will "jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat essential to the continued existence of those species, if there are reasonable and prudent alternatives available consistent with conserving the species or its habitat which would prevent jeopardy." Animal species designated as endangered or threatened under CESA are listed in California Code of Regulation, title 14, section 670.5. Plant species designated as endangered or threatened under

CESA, or designated as a rare plant species under the California Native Plant Protection Act (Fish and G. Code, section 1900 et seq.), are listed in California Code of Regulations, title 14.

Section 2081 of CESA authorizes the take of endangered, threatened, or candidate species if take is incidental to otherwise lawful activity and if specific criteria are met. These provisions also require CDFW to coordinate consultations with the USFWS for actions involving federally listed species that are also state–listed species. In certain circumstances, CESA allows CDFW to adopt a federal ESA incidental take authorization as satisfactory for CEQA purposes based on findings that the federal permit adequately protects the species and is consistent with state law. These criteria closely mirror the issuance criteria established for the federal Habitat Conservation Plan program under ESA Section 10. A CESA permit may not authorize the take of fully protected species that are protected in other provisions of the California Fish and Game Code.

California Fish and Game Code

California Fish and Game Code sections 3511 (birds), 4700 (mammals), 5050 (reptiles and amphibians), and 5515 (fish) designate certain species as fully protected and provide that those species may not be taken or possessed except pursuant to an approved Natural Communities Conservation Plan or a permit from CDFW for "necessary scientific research, including efforts to recover fully protected, threatened, or endangered species." CDFW cannot authorize take or possession of fully protected species for necessary scientific research if that research is conducted in connection with mitigation for a project (Fish and G. Code, section 3511, 4700, 5050, and 5515).

In addition to CESA and section 3511, the California Fish and Game Code includes other provisions for protection of birds, nests, and eggs. It is generally unlawful to take, possess, or needlessly destroy the nests or eggs of any bird and to take or possess any migratory nongame bird designated in the MBTA, except as allowed by the MBTA (Fish and G. Code, sections 3503 and 3513). It is unlawful to take, possess, or destroy any birds of prey, or to take, possess, or destroy nests or eggs of such birds (Fish and G. Code, section 3503.5). "Birds of prey" means species in the orders Falconiformes and Strigiformes.

California Wetlands Conservation Policy (Executive Order W–59–93)

In 1993, Governor Pete Wilson signed Executive Order W–59–93, the state's "No Net Loss" policy for wetlands, establishing a State Wetland Conservation Policy and providing comprehensive direction for the coordination of state–wide activities for the preservation and protection of wetland and stream habitats.

On April 2, 2019, consistent with Executive Order W–59–93, the State Water Board adopted the State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State. These rules provide a common, statewide definition of what constitutes a wetland and to provide consistency in the way the State Water Board and nine regional water boards regulate activities to protect wetlands and other waterways, such as rivers and streams, and bays and estuaries. The rules define what is considered a wetland; include a framework for determining if a feature defined as a wetland is a "water of the state" subject to regulation; and clarify requirements for permit applications to discharge dredged or fill material to any water of the state.

4.7.2.3 Local

Tehama County General Plan

The Tehama County General Plan (Tehama County, 2009) is a comprehensive document that provides policies and guidelines for the future expansion and development of the community. The Tehama County General Plan emphasizes agriculture as a way of life and the foundation of the quality of life in Tehama County. Urban uses are encouraged in this plan, but only in areas with existing services, or where services can be provided efficiently. The Open Space and Conservation Element (Section 6.0) provides guidance for the conservation, development, and use of natural resources and open space land within Tehama County. This includes policies pertaining to wildlife resources.

- *Policy OS–3.1:* Tehama County shall preserve and protect environmentally–sensitive and significant lands and water valuable for their plant and wildlife habitat, natural appearance, and character.
  - *Implementation Measure OS–3.1a:* Significant wildlife and wildlife habitats shall be protected through designations under the Natural Resource Conservation Land Use Classifications as shown in Table 4.7–5 below.

Table 4.7–5. Natural Resource Conservation Land Use Classifications

Sub–Category	Purpose and Use	Criteria	Planning Conditions
Resource Lands	To identify and afford protection to riparian habitats	Identified riparian habitat, resource lands, natural area (CDFG, CNDDB)	Regulation of land use Regulation of vegetation removal, and Use of setbacks or natural buffers
Habitat Resources	To protect and maintain documented, significant wildlife habitats for their aesthetic and ecological values. These areas are defined as supporting habitat for sensitive animal and plant species. These lands should remain in their natural states, yet may allow wilderness study, grazing and passive recreational activities (hiking, nature study) if these activities do not threaten the integrity of the habitat.	Identified as a significant natural by CNDDB, CNPS, and/or CDFG	Regulation of land use, Regulation of vegetation removal, and Regulation of the siting of structures.

Notes: CDFG = California Department of Fish and Game [Wildlife]
CNDDB = California Natural Diversity Data Base
CNPS = California Native Plant Society

  - *Implementation Measure OS–3.1b:* Continue to refer all new land division applications to the Department of Fish and Game [Wildlife] for review and comment.

Implementation Measure OS–3.1c For purposes of public access, the County shall work with non–profit and conservation entities to encourage the purchase and /or acquisition of access rights on private lands fronting along the Sacramento River. The County should also support easement donations from private property owners for similar purposes.

- *Implementation Measure OS–3.1d:* Encourage creation of habitat preserves that are immediately adjacent to one another in order to provide interconnected open space areas for animal movement.
- *Implementation Measure OS–3.1e:* In order to clarify and improve the effectiveness of the County procedures by which it will address potentially significant impacts to biological resources, and to mitigate such impacts as practicable, the County will work with responsible agencies, including CDFW, USFWS, NMFS and the USACE, to create Biological Resources Mitigation Guidelines (Biological Guidelines). The Biological Guidelines will focus and streamline project analysis and mitigation with respect to biological impacts.
- *Implementation Measure OS–3.1f:* Require that prior to any public or private development project in areas identified to contain or possibly contain special–status species – based on the Land Use Map, data provided in the Biological Resource section of the General Plan EIR or other suitable technical material available at the time – a biological survey be conducted by the project applicant to identify potentially occurring special–status species or their habitat using protocol acceptable to the regulatory agencies with authority over these species, or species presence shall be inferred. The results of the survey shall be documented in a Biological Resources Report.
- *Implementation Measure OS–3.1g:* For each project in which unavoidable removal of wetland habitat or other waters of the United States will occur, Tehama County shall require the project proponent to develop a compensation plan prior to construction.

- *Policy OS–3.3:* Tehama County shall support and coordinate Tehama County plans with inter–jurisdictional programs for Best Management Practices of riparian resources in Tehama County.
  - *Implementation Measure OS–3.3a:* Work with state and federal agencies on Tehama County plans with respect to any areas with riparian resources, identify and implement Best Management Practices for the plans.
- *Policy OS–3.4:* Tehama County shall endeavor to provide for wildlife circulation in and around new development projects, major transportation facilities, roads, railroads, and canals.
  - *Implementation Measure OS–3.4a:* Review projects through the entitlement process and CEQA analysis to ensure that they comply with this policy if the site contains unique habitat, creeks and/or wooded corridors.
  - *Implementation Measure OS–3.4b:* The effect on wildlife movement shall be analyzed prior to the approval of proposed development that encroaches upon vital

corridors. The analysis shall include consultation with the CDFG to properly evaluate current wildlife movement and migration.

  - *Implementation Measure OS–3.4c:* In such cases where habitat preserves are crossed by a roadway, or where two adjacent preserves are separated by a roadway, the roadway shall be designed or upgraded with wildlife passable fencing separating the roadway from the preserve and/or shall incorporate design features that allow for the movement of wildlife across or beneath the road without causing a hazard for vehicles and pedestrians on the roadway.

- *Policy OS–3.5:* Tehama County shall work with state and federal agencies to control and eliminate invasive plants from Tehama County.
  - *Implementation Measure OS–3.5a:* Contact the appropriate state and federal agencies to determine potential assistance and obtain information for the control of invasive plant species.
  - *Implementation Measure OS–3.5b:* Create an educational leaflet that identifies common invasive species and recommends the planting of non–invasive species.
  - *Implementation Measure OS–3.5c:* Explore the feasibility of adopting and maintaining a Noxious Weed Ordinance. The Noxious Weed Ordinance shall include restrictions on the use of non–native exotic species known to be invasive and damaging to existing plant species.
- *Policy OS–3.6:* Tehama County shall explore options for the establishment of a Tehama County owned wetland bank.
  - *Implementation Measure OS–3.6a:* During the environmental review process, Tehama County shall evaluate feasible on–site alternatives that will reduce impacts to wetland resources and effectively preserve these resources.
  - *Implementation Measure OS–3.6b:* Encourage projects that contain wetland preserves or creeks, or are located adjacent to wetland preserves or creeks, to be designed for maximum visibility and, as appropriate, access.
  - Implementation Measure OS–3.6c: Investigate the feasibility of a Tehama County–owned mitigation bank for wetland loss.
- *Policy OS–3.7:* Tehama County shall promote best management practices of natural resources that will enhance wildlife habitat.
  - *Implementation Measure OS–3.7a:* Water diversions/dams constructed along anadromous fish streams shall be designed to protect fish populations and to ensure adequate flow levels for spawning activity during migratory seasons in accordance with state and federal regulations.
- *Policy OS–4.1:* Tehama County shall promote economic studies on the value of alternative and sustainable rangeland products such as fee hunting, eco–tourism, and organic agriculture.
  - *Implementation Measure OS–4.1a:* Work with the Tri–County Economic Development Corporation and the Tehama Economic Development Corporation to

pursue economic studies that identify, support, and develop sustainable rangeland products.

- *Policy OS–4.2:* Tehama County shall use the resources and expertise of the Tri–County Economic Development Corporation, the Tehama Economic Development Corporation, Tehama County Resource Conservation District, and the Tehama County Farm Bureau in order to promote non–traditional low intensity business ventures within the oak woodlands of Tehama County.
  - *Implementation Measure OS–4.2a:* Work with the Tri–County Economic Development Corporation and the Tehama Economic Development Corporation to identify, support, and develop non–traditional businesses that use the oak woodlands of Tehama County.
- *Policy OS–4.3:* Tehama County shall educate landowners on the economic and environmental benefits of maintaining and restoring oak woodlands
  - *Implementation Measure OS–4.3a:* When harvesting oaks for fuel or range improvement, Tehama County shall encourage landowners to maintain an average leaf canopy of at least 30 percent.
  - *Implementation Measure OS–4.3b:* Where commercial or extensive harvest is being contemplated, Tehama County shall seek professional advice from such resources as UC Cooperative Extension (Farm Advisor), USDA Natural Resource Conservation Service (NRCS), CalFire, CDFW, and private consultants.
- *Policy OS–4.4:* Tehama County shall inform private landowners about the value of well–managed oak woodlands.
  - *Implementation Measures OS–4.4a:* Educate landowners about potential threats to oak woodlands in Tehama County.
  - *Implementation Measure OS–4.4b:* Seek funding that supports outreach to private landowners through the Tehama County Resource Conservation District, the NRCS, UC Cooperative Extension, Wildlife Conservation Board, and other organizations.
- *Policy OS–5.1:* Tehama County shall promote the conservation of large working ranches with significant oak woodlands.
  - *Implementation Measure OS–5.1a:* Recognize sites according to landscape variables (size, shape, and connectivity to other habitats such as riparian) that support rich sustainable wildlife populations.
  - *Implementation Measure OS–5.1b:* Recognize sites where prescribed fire can be safely used as a management tool.
  - *Implementation Measure OS–5.1c:* Recognize sites that warrant voluntary protection according to threat and funding potential.
- *Policy OS–5.2:* Tehama County shall encourage the voluntary protection of woodlands through appropriate conservation measures.
  - *Implementation Measure OS–5.2a:* Develop partnerships between government and non–profit organizations to encourage protection of oak woodlands.

  - *Implementation Measure OS–5.2b:* Use land protection techniques which include conservation easements, oak tree mitigation banks and other forms of real estate transactions to protect significant oak woodland areas.
  - *Implementation Measure OS–5.2c:* Tehama County shall explore the feasibility of an Oak Woodlands Ordinance.

- *Policy OS–6.1:* Tehama County shall strive for the restoration of oak woodlands that lack regeneration.
  - *Implementation Measure OS–6.1a:* In areas where oaks have been removed and are not regenerating, Tehama County shall promote voluntary tree planting programs and measures that provide protection of oak seedlings from browsing and weeds.
  - *Implementation Measure OS–6.1b:* Participate in state and federal cost share programs and grants.
- *Policy OS–6.2:* Tehama County shall support the control of invasive weed species in oak woodlands.
  - *Implementation Measure OS–6.2a:* In coordination with the Colusa–Glenn–Tehama Weed Management Area, Tehama County shall seek funding to map the location and abundance of target weeds in oak woodlands.
  - *Implementation Measure OS–6.2b:* Where possible, Tehama County shall introduce prescribed fire and other methods to help control the spread of medusa–head grass, yellow star thistle, giant reed, and other invasive wildland weed species.
- *Policy OS–6.3:* Tehama County shall promote the reestablishment of native under story species.
  - *Implementation Measure OS–6.3a:* Encourage restoration of native plants as an alternative to exotic grasses. (Native plants will reduce weeds and may provide a longer grazing season for livestock.)
  - *Implementation Measure OS–6.3b:* Encourage diverse under story vegetation including shrubs. (Habitat with multiple layers of vegetation provide habitat for many bird species.)
- *Policy OS–7.1:* Tehama County shall request that the Tehama County Hardwood Advisory Committee periodically evaluates the state of oak woodlands using available data sources such as the California Department of Forestry and Fire Protection's FRAP (Fire and Resource Assessment Program) data.
  - *Implementation Measure OS–7.1a:* The Tehama County Hardwood Advisory Committee shall meet semiannually to evaluate the state of oak woodlands in Tehama County.
- *Policy OS–7.2:* Tehama County shall foster communication between land managers, ranchers, and scientists regarding the protection and management of oak woodlands.
  - *Implementation Measure OS–7.2a:* Encourage workshop, symposiums, field trips, and other methods of outreach regarding oak woodlands.

- *Policy OS–7.3:* Tehama County shall encourage research on oak woodland habitats. Implementation Measure OS–7.3a Encourage studies that evaluate oak regeneration in Tehama County.
  - *Implementation Measure OS–7.3b:* Encourage studies that evaluate the effects of changing land uses on oak woodland's current values – wildlife, ranching, economics, etc.
  - *Implementation Measure OS–7.3c:* Encourage studies that provide Tehama County ranchers and other members of the agricultural community with better and more specific information about the sustainable management of oak woodlands.

Voluntary Oak Woodland Management Plan

In 2004, Senate Bill 1334 (The Oak Woodlands Conservation Act) was passed by the California Legislature. This legislation added section 21083.4 to the Public Resources Code related to oak woodland conservation. The Oak Woodlands Conservation Act requires the consideration of oak woodland conservation as part of CEQA. In accordance with Public Resources Code section 21083.4, the Tehama County Board of Supervisors adopted the Voluntary Oak Woodland Management Plan in 2005. The purpose of this document was to expand upon, refine, and improve voluntary oak protection guidelines that had been established by Tehama County in 1994, and to provide a consistent policy for conservation and use of oak woodland habitats throughout Tehama County.

4.7.3 Analysis Methodology

4.7.3.1 Analytical Approach

The following section provides a brief overview of the analytic methodologies used in assessing the potential impacts of the Proposed Project on terrestrial biological resources. These methodologies include a comprehensive literature search and focused field surveys.

Evaluation of the possible presence of special–status plant and wildlife species and sensitive plant communities within the Proposed Project study area were conducted using database searches (the CNDDB and CNPS Online Inventory), and reviewing environmental documents and technical studies prepared for the Proposed Project as part of the Final License Application. The CNDDB contains occurrence records for special–status plant and animal species as well as sensitive natural vegetation communities by USGS quadrangle. The CNPS Inventory allows users to query the Inventory of Rare and Endangered Vascular Plants of California using a set of search criteria to generate a list of special–status plant species.

The Proposed Project has been evaluated for its potential to affect biological resources based on local, state, and federal agency regulations, policies, and guidelines, as summarized previously. This analysis considers both direct and indirect impacts. Each potential impact was evaluated qualitatively and, in some cases, quantitatively, by estimating Proposed Project–related potential impacts to the terrestrial biological resources and comparing changes to existing conditions using the significance criteria described below.

4.7.3.2 Criteria for Determining Significance

The significance criteria used to evaluate the Proposed Project impacts to aquatic resources are based on best professional judgement and, where applicable, Appendix G of the CEQA Guidelines. Accordingly, a significant impact related to terrestrial resources could occur if the Proposed Project would:

- Have a substantial adverse effect, either directly or through habitat modifications, on any terrestrial species identified as a candidate, sensitive, or special–status species in local or regional plans, policies, or regulations, or by the CDFW or USFWS;
- Have a substantial adverse effect on any riparian habitat or other sensitive natural community associated with terrestrial species identified in local or regional plans, policies, regulations, or by the CDFW or USFWS;
- No net loss of wetlands;
- Interfere substantially with the movement of any native resident or migratory wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites;
- Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance; or
- Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state Habitat Conservation Plan.

4.7.4 Applicant's Proposed Measures

4.7.4.1 General Construction Measures

1. Develop a construction plan to be filed for FERC approval prior to the start of ground–disturbing activities. This construction plan should also be closely coordinated with the SWPPP.
2. Limit land disturbance and vegetation clearing to those areas needed for construction. Delineate the limits of construction, work areas, and multipurpose areas with flagging, fencing, and/or stakes to prevent land–disturbing activities outside of construction areas.
3. Stockpile natural topsoils and replace, regrade, and revegetate disturbed areas, in accordance with California forestry regulations and best practices, with native vegetation. Restore disturbed stream and riparian habitat to pre–construction conditions and with riparian plantings and/or seeding, where applicable, with seed mixes recommended by CDFW.

4.7.4.2 Biological Resources Protection Measures

1. Maintain upstream and downstream fish passage at the Project during construction by constructing the diversion structure in phases or by providing a temporary diversion culvert to allow fish to pass the site.

2. Conduct monitoring during construction to ensure that measures to protect biological resources are implemented appropriately, using staff trained in the identification of special–status species and their habitats.
3. Provide environmental training to construction staff and implement BMPs to protect threatened and endangered species and special–status plant species and their habitats.
4. Conduct pre–construction inspections of all areas of suitable habitat for threatened and endangered and special–status plant species where surveys have not previously been conducted, and implement specified protection measures as necessary.
5. Avoid streams, wetlands, and pond habitats to the extent possible during construction, and use existing stream and wetland crossings where possible.
6. Monitor fish behavior at the Project tailrace and modify the tailrace if fish attraction is observed.
7. Avoid ground–disturbing activity on or near talus slopes to protect Sierra Nevada red fox and American pika.
8. Avoid construction activity within or near potential bat roosting habitat, including rock crevices, cliffs, and snags. Incorporate this and other construction–specific measures into a construction plan for FERC approval.
9. Map, evaluate, and quantify, by vegetation type, the vegetation that would be removed as a result of Proposed Project construction.

4.7.4.3 Raptors and Migratory Bird Measures

1. Conduct pre–construction surveys for migratory bird nests within 100 feet of any areas that would be disturbed during the typical nesting season from April 15 to July 31 to identify nest locations and their status.
2. Restrict construction activities within 100 feet of any active migratory bird nests found during the pre–construction surveys.
3. Conduct pre–construction raptor nest surveys in suitable habitat within one mile of any areas that would be disturbed during the appropriate nesting time periods (January through August) to identify nest locations and their status.
4. Determine in consultation with CDFW and apply an appropriate buffer for restricting construction activities around any active raptor nests found during pre–construction.

4.7.4.4 Special–Status Habitat/Vegetation Measures

1. Conduct pre–construction inspections for slender Orcutt grass, elderberry, and vernal pool habitat in areas of proposed disturbance not previously surveyed in 2013.
2. Adjust the transmission line design to avoid any areas where these species or habitats are found.

4.7.4.5 Other Environmental Management and Monitoring Plans

Noxious Weed Management and Revegetation Plan: The Noxious Weed Management and Revegetation Plan (Tetra Tech, 2014) includes measures to ensure weeds and non–native invasive vegetation do not reestablish at onsite disposal areas during Proposed Project construction, with modifications. The modifications include provisions for riparian plantings along disturbed portions of South Fork Battle Creek to provide overhanging vegetation, monitoring of restoration success, criteria for additional reseeding if by the end of a 2–year monitoring period the criteria are not met, preconstruction treatment of existing non–native invasive plant populations on Proposed Project lands, and measures to protect rare plant species from control measures targeting noxious weed species.

In addition, Rugraw has agreed to develop and implement, in consultation with resource agencies, the following additional plans:

- Avian Protection Plan
- Bald Eagle and Raptor Management Plan

4.7.5 Environmental Impacts and Mitigation

Rugraw has proposed general construction measures, various resource protection measures, and is required to implement Environmental Management and Monitoring Plans (Chapter 2, Project Description). Relevant measures and management and monitoring plans are listed below.

4.7.5.1 Impacts Related to Special–status species or Their Habitats

IMPACT 4.7–1: Would the Proposed Project 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 or USFWS?

Effects to Special–Status or Listed Plants

Construction

Only one special–status species was observed during 2013 field surveys, Coleman's rein orchid. Eight individuals of this species were observed in one location in the central portion of the Project area (Figure 5–3. Location of Coleman's Rein Orchid Observed within the Project Area). These individuals were growing on a southwest facing slope in an area of second–growth Sierran mixed conifer forest that had been relatively heavily burned in the fires of 2012. This species is not expected to be affected by Proposed Project construction or operation because Proposed Project facilities have been located to avoid this population. In addition, as described in Mitigation Measure 1, the Noxious Weed Management and Revegetation Plan will be modified to include a measure that states that qualified biologist will flag the known population of Coleman's rein orchid. No ground disturbing activities will occur within 50 feet of the known population of Coleman's rein orchid during construction of the Proposed Project transmission line.

The Proposed Project is located within range of one federally listed plant, slender Orcutt grass, which is associated with vernal pool habitat. While no vernal pool habitat is currently documented in the Proposed Project area, this habitat may be present in previously unsurveyed portions of the Proposed Project area. To minimize the potential for effects to slender Orcutt grass in previously unsurveyed areas, Rugraw would implement Special–Status Habitat/Vegetation Measures, which require additional inspections in all areas of proposed disturbance and inspection of vegetation at the location of pole placements within previously unsurveyed areas during design of the transmission line. If vernal pool habitat is discovered along the transmission line route, the route would be modified as necessary to avoid this habitat. In addition, Biological Resources Protection Measure 2 states biological monitors (trained in identifying species and habitats) would be on–site during construction to ensure that any potential habitat would be avoided by the Proposed Project.

Indirect effects to special–status plants would include habitat loss or degradation and/or introduction and spread of noxious weeds.

Refer to Table 4.7–6 for a summary of acres of habitat alteration resulting from implementation of the Proposed Project. Overall, the Proposed Project would lead to permanent loss of approximately 58.81 acres, and would temporarily affect 11.37 acres, which together represents approximately 10 percent of the total land in the defined Proposed Project area. To minimize the effects of habitat loss, Rugraw would implement General Construction Measures. Measure 2 limits land disturbance and vegetation clearing to those areas needed for construction, and requires delineation of the limits of construction, work areas, and multipurpose areas with flagging, fencing, and/or stakes to prevent land–disturbing activities outside of construction areas. In addition, to restore temporarily disturbed areas, General Construction Measure 3 requires Rugraw to stockpile natural topsoils and replace, regrade, and revegetate disturbed areas, in accordance with California forestry regulations and best practices, with native vegetation. Disturbed stream and riparian habitat would be restored to pre–construction conditions and with riparian plantings and/or seeding, where applicable, with seed mixes recommended by CDFW. In addition, Biological Resources Protection Measure 2 states biological monitors (trained in identifying species and habitats) would be on–site during construction to ensure that any potential habitat would be avoided by the Proposed Project. Construction personnel would receive environmental training regarding sensitive biological resources.

Table 4.7–6. Estimated Acres of Permanent and Temporary Habitat Alteration, by Vegetation Community Type

Vegetation Community	Existing Acres	Proposed Project Effects Temporary	Proposed Project Effects Permanent	Total Acres Affected	Percent Habitat Affected
Annual Grassland	**63.1**		**4.69**	**4.69**	**7%**
Agricultural					
Irrigated Hayfield	3.30		0.19	0.19	6%
Old Orchard	0.52			0	0%

Vegetation Community	Existing Acres	Proposed Project Effects Temporary	Proposed Project Effects Permanent	Total Acres Affected	Percent Habitat Affected
Blue Oak Woodland Communities					
Blue Oak–Foothill Pine–Interior Live Oak	37.01		3.18	3.18	9%
Blue Oak Woodland	32.47		3.87	3.87	12%
Chaparral					
Masticated Woodland	6.55		0.65	0.65	10%
Mixed Chaparral	19.67		0.24	0.24	1%
Montane Chaparral	59.49		6.46	6.46	11%
Disturbed/Developed					
Disturbed	5.58	0.28	0.89	1.17	21%
Himalayan Blackberry (*Rubus armeniacus*)	2.08		0.18	0.18	9%
Residential–Developed	2.13		0.02	0.02	1%
Road	6.90		3.08	3.08	45%
Montane Hardwood Communities					
Montane Hardwood	15.26			0	0%
Montane Hardwood–Conifer	75.64			0	0%
Ponderosa Pine and Plantation					
Plantation	23.87	1.12	1.17	2.29	10%
Ponderosa Pine	16.89		2.01	2.01	12%
Riparian and Wetland					
Riparian	2.49		0.31	0.31	12%
Riverine–Montane Riparian	3.85		0.69	0.69	18%
Wetland	0.07		0.01	0.01	14%
Rock	5.07		0.57	0.57	11%
Sierran Mixed Conifer	347.98	9.97	30.60	40.57	12%
Total Acres:	**729.92**	**11.37**	**58.81**	**70.18**	**10%**

Ground disturbance associated with construction could also result in the introduction of new noxious weeds or spread of existing noxious weed populations. Noxious weeds can degrade habitat for native plants through shading, competition for resources, release of growth–inhibiting chemicals (allopathy), etc. Rugraw would implement the Noxious Weed Management and Revegetation Plan (refer to Section 1.3.5.2 of *Chapter 3, Proposed Project Description*) to minimize the potential for degradation of native habitats resulting from the introduction or spread of noxious weeds. The Noxious Weed Management and Revegetation Plan includes preventative measures (e.g., vehicle cleaning and use of certified weed–free straw, hay, and mulch); treatment of selected noxious weed populations; and revegetation of disturbed areas as

soon as possible following cessation of Proposed Project construction. Treated and revegetation areas would be monitored for two years to assess effectiveness.

With implementation of Rugraw–proposed measures and other environmental management and monitoring plans (i.e., the Noxious Weed Management and Revegetation Plan) that have been incorporated into the Project, potential construction–related effects to special–status plants and their habitat would be less than significant.

Construction Impacts – Special–status or Listed Plants

- **Level of Significance:** Less Than Significant
- **Mitigation Measures:** None Required

Operations and Maintenance

Special–status plants could potentially be affected by ongoing maintenance of the Proposed Project following completion of construction. As described in Section 1.3.3.8, the transmission line, service station line, and pipeline/penstock rights–of–way would require regular vegetation management activities to ensure the safe operation and reliability of the Proposed Project. Vegetation clearing, via mechanical means manual means, and/or herbicide application, would be conducted every other year, or more often as may be desired or required. Incorporating Recommended Measure BIO–1 into the Noxious Weed and Revegetation Plan would avoid impacts to special–status plants during vegetation clearing. This measure states that a qualified biologist would conduct targeted surveys for special–status and listed plants potentially occurring in the areas to be cleared of vegetation as part of routine vegetation management over the term of the license. If special–status or listed plants are documented, Rugraw would develop appropriate avoidance and protection measures considering the species affected and site–specific conditions. Such measures may include, but are not limited to, flagging and avoiding the individuals, or timing vegetation management activities to occur outside the blooming period of the plants for annual species. The results of the pre–clearance surveys, and proposed avoidance and protection measures, would be documented in a brief memo and provided to CDFW and USFWS at least seven days prior to implementation of vegetation management.

In addition, ongoing use of vehicles and equipment brought in from outside the Proposed Project area and human foot traffic could potentially degrade habitat for special–status plants through the introduction or spread of noxious weeds. Recommended Measure BIO–2 would minimize the potential for the introduction or spread of noxious weeds. This measure clarifies that specific BMPs included in the Noxious Weed Management and Revegetation Plan would be implemented throughout the term of the new license, as well as during construction of the Project. These measures are:

- Limiting ground–disturbing activities and vegetation clearing to the smallest footprint possible, while allowing for safe construction of the Project.
- Preserving vegetation in place to the extent possible.
- Thoroughly cleaning all construction equipment and clothing before entering the Project area to reasonably ensure that seeds and propagules of noxious weeds are not introduced.

- Using certified weed–free straw, hay, and mulch for all construction, erosion control, and restoration needs.
- Restricting travel to established roads and avoid entering areas with existing populations of noxious weeds when possible. Conduct work in un–infested areas first whenever possible. Clean equipment that has been used in weed–infested areas before moving to other areas.

Implementation of Recommended Measure BIO–1 and Recommended Measure BIO–2 would reduce any potential effects to special–status plants resulting from ongoing vegetation management less than significant with mitigation. However, Rugraw did not agree to implement these measures, so the operation and maintenance impacts would be significant and unavoidable.

Operation and Maintenance Impacts – Special–status or Listed Plants

- **Level of Significance:** Significant and Unavoidable
- **Recommended Measure BIO–1:** Protection of Special–Status and Listed Plants during Construction or Routine Vegetation Management Activities. Rugraw would revise the Noxious Weed Management and Revegetation Plan to include the following:
  - **Coleman's rein orchid:** A qualified biologist would flag the known population of Coleman's rein orchid. No ground disturbing activities would occur within 50 feet of the known population of Coleman's rein orchid during construction of the Proposed Project transmission line.
  - Other special–status plants: A qualified biologist would conduct targeted surveys for special–status and listed plants potentially occurring in the areas to be cleared of vegetation as part of routine vegetation management over the term of the license.
  - If special–status or listed plants are documented, Rugraw would develop and implement appropriate avoidance and protection measures considering the species affected and site–specific conditions. Such measures may include, but are not limited to, flagging and avoiding the individuals, or timing vegetation management activities to occur outside the blooming period of the plants (for annual species).
  - The results of the pre–clearance surveys, and proposed avoidance and protection measures, would be documented in a brief memo and provided to CDFW and USFWS at least seven days prior to implementation of vegetation management.
- **Recommended Measure BIO–2:** Minimize the Potential for Introduction and Spread of Noxious Weeds during Ongoing Operations and Maintenance. Rugraw would revise the Noxious Weed Management and Revegetation Plan to state that the following measures would be implemented for the license term:
  - Limiting ground–disturbing activities and vegetation clearing to the smallest footprint possible, while allowing for safe construction of the Project.
  - Preserving vegetation in place to the extent possible.

- Thoroughly cleaning all construction equipment and clothing before entering the Project area to reasonably ensure that seeds and propagules of noxious weeds are not introduced.
- Using certified weed–free straw, hay, and mulch for all construction, erosion control, and restoration needs.
- Restricting travel to established roads and avoid entering areas with existing populations of noxious weeds when possible. Conduct work in un–infested areas first whenever possible. Clean equipment that has been used in weed–infested areas before moving to other areas.

Effects to Vernal Pool Fairy Shrimp

Construction, Operations, and Maintenance

While no vernal pool habitat is currently documented in the Proposed Project area, this habitat may be present in previously unsurveyed portions of the Proposed Project where the transmission line will be constructed. To minimize the potential for effects to vernal pool fairy shrimp in previously unsurveyed areas, Rugraw would implement Special–Status Habitat/Vegetation Measures, which require additional inspections in all areas of proposed disturbance and inspection of vegetation at the location of pole placements within previously unsurveyed areas during design of the transmission line. If vernal pool habitat is discovered along the transmission line route, the route would be modified as necessary to entirely avoid this habitat. Considering that vernal pool fairy shrimp are restricted to vernal pool habitats; and because the Proposed Project will be designed to avoid this habitat where it occurs, this impact is less than significant.

Construction, Operation, and Maintenance Impacts – Vernal Pool Fairy Shrimp

- **Level of Significance:** Less Than Significant
- **Mitigation Measures:** None Required

Effects to Special–Status Raptors and Other Birds

The Proposed Project area represents habitat for a number of special–status raptors and other (e.g., passerine) bird species. As effects to avian species are similar, the discussion of effects is grouped to include all special–status raptor and other bird species.

Construction

Vegetation clearing, construction noise (including helicopter use), and increased human activity may directly affect special–status raptors or other birds during construction of the Proposed Project. While there are no raptor nests or other bird nests documented in the Proposed Project area, construction activities occurring during the breeding season may directly affect the establishment of previously unidentified or new nests, or, if new nests are present, may adversely affect reproductive success.

Rugraw proposed Raptor and Migratory Bird Measures 1–4 (Section 4.7.4.1) would be implemented to minimize the potential for construction–related effects to special–status raptors or other birds, including nests. These measures require pre–construction surveys for raptor

nests within one mile of any areas that would be disturbed during the appropriate nesting time periods (January through August) to identify nest locations and their status. If nests are identified, Rugraw would consult with CDFW to determine an appropriate buffer within which construction activities would be restricted. Pre–construction surveys for other migratory birds would be conducted within 100 feet of any areas that would be disturbed during the typical nesting season of April 15 to July 31 to identify nest locations and their status. If any non–raptorial migratory bird nests are identified, a 100–foot buffer would be implemented around the nest within which construction activities would be constricted. In addition, Biological Resources Protection Measures 2 and 3 (Section 4.7.4.1) require biological monitors on–site during construction to ensure that that measures to protect biological resources, including birds and nests, are appropriately implemented. Construction personnel would receive environmental training regarding sensitive biological resources.

The construction of the Proposed Project could result in loss or degradation of habitat for special–status birds. It is estimated that construction of the Proposed Project would result in a permanent alteration or loss of 52.87 acres and 11.09 acres of temporary effects to vegetation representing suitable habitat for special–status birds (agricultural, developed/disturbed, and rock habitats have been excluded from this analysis). Overall, this represents loss or alteration of approximately nine percent of the existing habitat in the Proposed Project area. Refer to Table 4.7–7, below, for a summary of habitat impacts, by grouped by general vegetation community type.

Table 4.7–7. Temporary and Permanent Effects to Suitable Habitat for Special–Status Raptors or Other Migratory Birds

Vegetation Community Types	Acres Present	Estimated Temporary Impact (Acres)	Estimated Permanent Impact (Acres)	Estimated Total Impact (Acres)	Percent Total Habitat Impacted
Grassland	63.1	0	4.69	4.69	7%
Shrub/Chaparral	85.71	0	7.35	7.35	9%
Blue Oak Woodland	69.48	0	7.05	7.05	10%
Montane Hardwood	90.90	0	0	0	0%
Conifer Forest	388.74	11.09	33.78	44.87	12%
Riparian and Wetland	6.41	0	1.01	1.01	14%
Total Acres:	**704.34**	**11.09**	**52.87**	**63.96**	**9%**

Rugraw has proposed several measures intended to minimize the effects of loss or alteration of habitat. General Construction Measures 2 and 3 (Section 4.7.4.1) include requirements to limit land disturbance and vegetation clearing to those areas needed for construction; to delineate the limits of construction, work areas, and multipurpose areas with flagging, fencing, and/or stakes to prevent land–disturbing activities outside of construction areas. Revegetation requirements include stockpiling natural topsoils and replacing, regrading, and revegetating disturbed areas with native vegetation. Specifically, the Noxious Weed Management and Revegetation Plan states that Rugraw will develop seed mixes in consultation with state and

local agencies, which will be applied, as appropriate, to all areas of temporary disturbance as soon as possible following completion of construction. Disturbed stream and riparian habitat would be restored to pre–construction conditions and with riparian plantings (willows and alders) and/or seeding, where applicable, with seed mixes recommended by CDFW. Revegetated areas will be monitored annually for two years to assess successful establishment of desired vegetation and to determine if additional seed mix and or riparian plantings need to be installed

The potential for introduction or spread of nonnative invasive plants could also degrade the quality of habitat not otherwise affected by the Proposed Project, particularly within more open habitats such as grasslands and woodlands. Rugraw is required to implement a Noxious Weed Management and Revegetation Plan to minimize the potential for degradation of native habitats resulting from the introduction or spread of nonnative invasive plants. The Noxious Weed Management and Revegetation Plan includes preventative measures (e.g., vehicle cleaning and use of certified weed–free straw, hay and mulch); treatment of selected nonnative invasive plants populations; and revegetation of disturbed areas as soon as possible following cessation of Proposed Project construction. Treated and revegetation areas would be monitored for two years to assess effectiveness.

The South Fork Battle Creek provides foraging habitat for bald eagle and osprey. These species, therefore, could be indirectly affected by temporary reduction in foraging habitat during construction; or by effects to aquatic prey species (fish) either during construction or as a result of longer–term operations of the Proposed Project. As described below, in–water construction would be limited to the period between July 1 and October 15, during which time bald eagles and osprey would likely be excluded from foraging. This effect would be limited to the Proposed Project area itself. Flows and passage of fish upstream or downstream of the site would be maintained and available for foraging. Therefore, the effect of temporary reduction in foraging habitat would be less than significant. For impacts related to aquatic resources, including fish passage, is addressed in *Section 4.6, Biological Resources – Aquatics and Fisheries*.

Several measures described in Section 4.7.4.1 would be implemented to minimize the potential for construction–related effects to water quality within aquatic habitats and fish. Rugraw is required to develop and implement a Construction Plan (General Construction Measure 1) to minimize sedimentation resulting from construction. The Construction Plan, which would be closely coordinated with the SWPPP (General Construction Measure 4) would restrict in–water work to the period between July 1 and October 15, when streamflows are low, to protect water quality and aquatic resources (General Construction Measure 6). Biological Resources Protection Measure 1 requires Rugraw to maintain upstream and downstream fish passage at the Proposed Project during construction by constructing the diversion structure in phases or by providing a temporary diversion culvert to allow fish to pass the site. Refer also to *Section 4.6, Biological Resources – Aquatics and Fisheries*, *and Fisheries* which provides a detailed discussion of impacts to fish.

With implementation of Rugraw–proposed measures and other environmental management and monitoring plans (i.e., the Noxious Weed Management and Revegetation Plan) that have been incorporated into the Proposed Project, potential construction–related effects to special–status birds or their habitat would be less than significant.

Construction Impacts – Special–status Raptors and Other Birds

- **Level of Significance:** Less Than Significant
- **Mitigation Measures:** None Required

Operations and Maintenance

Operation of a 12–mile transmission line would present a collision risk and electrocution hazard for avian species that reside within or traverse Proposed Project lands. The risk of avian mortality associated with above–ground transmission lines is greatest on small voltage (i.e., 69 kV or less) lines such as the proposed 60–kV line due to the close spacing of conductors. Large–bodied birds, such as raptors or wading birds, are at greatest risk because of their long wing spans that can reach between conductors. Additionally, larger species are often less agile in flight compared to smaller species, and thus are less able to avoid collisions with lines.

Rugraw would implement several measures to reduce the likelihood of avian injury or mortality related to transmission line collisions or electrocutions. As part of the Proposed Project, Rugraw has committed to develop an Avian Protection Plan (Section 1.3.5.4), which would require Rugraw to design and construct the transmission lines consistent with Avian Power Line Interaction Committee Guidelines and USFWS Avian Protection Plan Guidelines to reduce the risk of avian interactions with the proposed transmission line. Rugraw is also required to develop and implement a Bald Eagle and Raptor Management Plan (Section 1.3.5.4) using USFWS's National Bald Eagle Management Guidelines. The Bald Eagle and Raptor Management Plan, at a minimum, would include the use of species–specific distance buffers, landscape buffers, seasonal restrictions, and additional recommendations to avoid effects to raptors resulting from ongoing operations and maintenance of the Proposed Project.

Finally, removal of trees shrubs as part of ongoing vegetation management could potentially affect nesting birds over the term of the license. In order to avoid active nests (i.e., nests with eggs or young), Rugraw would need to implement Recommended Measure BIO–3, which would require that the Avian Protection Plan include the following commitment:

- Vegetation removal (i.e., tree or shrub removal, tree limb removal, and brush mastication) would be conducted between September 1 and February 14 to avoid the general nesting bird season.
- If this is not possible, a qualified biologist would conduct a pre–activity survey for active bird nests within the area proposed for vegetation removal, non–routine maintenance, or construction activity, plus a 300–foot (raptors) and 50–foot (non–raptors) survey area, within 2 weeks of commencement of the activities.
- If active bird nests are found within the survey area, a qualified biologist would determine an appropriate no–work buffer, based on site–specific conditions, including observations of the nesting birds' behavior and sensitivity to human activity; proximity to existing human activity or development (e.g., roads, structures); current site conditions (e.g., screening vegetation, terrain); and site–specific, work–related activities.

Excepting emergencies, no activities would be allowed within the buffer until the biologist has determined that the young have fledged and are no longer occupying the nest, or the nesting attempt has failed. With implementation of Rugraw–proposed measures, other environmental management and monitoring plans (i.e., the Avian Protection Plan and the Bald Eagle and

Raptor Management Plan) that have been incorporated into the Project, and with implementation of Mitigation Measure BIO–3, effects to special–status birds from ongoing operations and maintenance would be less than significant. However, Rugraw did not agree to implement this measure, so the operation and maintenance impacts would be significant and unavoidable.

Operation and Maintenance Impacts – Special–status Raptors and Other Birds

- **Level of Significance:** Significant and Unavoidable
- **Recommended Measure BIO–3:** Protection of Active Bird Nests. Rugraw would include the following measure in its Avian Protection Plan:
  - Vegetation removal (i.e., tree or shrub removal, tree limb removal, and brush mastication) would be conducted between September 1 and February 14 to avoid the general nesting bird season.
  - If this is not possible, a qualified biologist would conduct a pre–activity survey for active bird nests within the area proposed for vegetation removal, non–routine maintenance, or construction activity, plus a 300–foot (raptors) and 50–foot (non–raptors) survey area, within 2 weeks of commencement of the activities.
  - If active bird nests are found within the survey area, a qualified biologist would determine an appropriate no–work buffer, based on site–specific conditions, including observations of the nesting birds' behavior and sensitivity to human activity; proximity to existing human activity or development (e.g., roads, structures); current site conditions (e.g., screening vegetation, terrain); and site–specific, work–related activities.
  - Excepting emergencies, no activities would be allowed within the buffer until the biologist has determined that the young have fledged and are no longer occupying the nest, or the nesting attempt has failed.

Effects to Spotted Bat

Construction

Most bat species, including spotted bats, forage primarily at dusk or dark. As construction activities would occur during the day, foraging spotted bats are unlikely be directly disturbed by construction activities.

There are no known spotted bat maternal roosts or hibernacula in the Proposed Project area, and Proposed Project construction activities are not expected to directly affect mines, caves, or rock crevices providing maternal roosting or hibernating structures for spotted bats. Noise associated with Proposed Project construction could disturb roosting bats if construction occurs during the pup season (generally June 1–August 31). However, based on a review of the habitat assessment conducted for the Proposed Project (Tetra Tech 2015c), suitable cliff and rock habitat is limited to approximately 5 acres (of a total of 730 acres) and is generally located 300 feet or greater from Proposed Project facilities. Construction noise would be temporary and short–term, and would be attenuated over the distance from the construction areas to the rocks and cliffs that represent habitat for this species. Intervening trees would further dampen construction noise. Rugraw will implement Biological Resources Protection Measures 2, 3, and

8 to further minimize any potential for disturbance to roosting spotted bats. These measures state that Rugraw will avoid construction within or near suitable spotted bat roosting habitat, construction personnel would receive environmental training regarding measures to protect biological resources, and monitors would be present during construction to ensure that such measures are implemented appropriately.

Foraging habitat for spotted bats consists generally of open land where insects are present. Construction of Proposed Project facilities would result in development of some portion of these open lands. However, considering that the habitat requirements are general (open lands where prey species are present) and that the Proposed Project footprint, upon completion, is relatively small in comparison to the landscape, the Proposed Project is not expected to limit foraging opportunities for bats, including spotted bats.

While mines, caves, or rock crevices for maternal roosts or hibernacula are present in the landscape, as described above these features form a small percentage of the total habitat present and are generally located more than 300 feet from Proposed Project facilities. Therefore, construction would not result in alteration of these habitats. Any potential for effects to habitat would be further reduced through implementation of General Construction Measure 1, which states that Rugraw will delineate the limits of construction, work areas, and multipurpose areas with flagging; and Biological Resources Protection Measure 2, which states that a biological monitor would be present to assist in compliance with measures, including preventing land–disturbing activities outside of flagged areas.

Considering that spotted bats and their habitat are unlikely to be affected by construction, and with implementation of Rugraw–proposed measures to be implemented as part of the Proposed Project, the potential for indirect effects to habitat for roosting bats would be considered less than significant.

Construction Impacts – Spotted Bat

- **Level of Significance:** Less Than Significant
- **Mitigation Measures:** None Required

Operations and Maintenance

As described above in regards to construction–related impacts, spotted bat foraging requirements are very general (open habitats that support moths and other prey) and foraging habitat is therefore abundant in the general vicinity. Ongoing maintenance activities are limited to the rights–of–way around Proposed Project facilities, and would typically be implemented during daylight hours, and therefore would not interfere with the foraging timing of spotted bats. In addition, cliffs and rocks that represent suitable maternal roost habitat are generally located more than 300 feet from Proposed Project facilities, and would not be directly affected by vegetation management or other ongoing maintenance activities. Therefore, effects of ongoing operations and maintenance on pallid bats or their habitats are less than significant.

Operation and Maintenance Impacts – Spotted Bat

- **Level of Significance:** Less Than Significant
- **Mitigation Measures:** None Required

Effects to Sierra Nevada Red Fox

Construction

Ground–disturbing work will not occur within suitable habitat for Sierra Nevada red fox. In addition, this is a nocturnal species that is unlikely to be foraging in the Proposed Project area during daytime construction activities. Denning habitat may exist in talus slopes and rockslides. Based on a review of the habitat assessment conducted for the Proposed Project (Tetra Tech 2015c), the talus habitats were identified at only one location in the study area (on the south–facing slope in the Proposed Project vicinity) more than 400 feet from the proposed transmission line. While construction noise from the Proposed Project may disturb this species, particularly in early spring (March through May) when young are in maternal dens (USFWS 2015), any noise would be temporary and short–term, and would be attenuated over the distance from the construction areas to the rocks and cliffs that represent habitat for this species. Intervening trees would further dampen construction noise. Biological Resources Protection Measure 7 would further minimize the potential for disturbance to Sierra Nevada red fox, if present in the Proposed Project vicinity. This measure states that Rugraw will avoid construction on or near talus slopes representing denning habitat for Sierra Nevada red fox. Furthermore, construction personnel would receive environmental training regarding measures to protect biological resources, and monitors will be present during construction to ensure that such measures are implemented appropriately.

Construction would not result in direct alteration of talus habitats providing denning habitat for Sierra Nevada red fox. Any potential for effects to habitat would be further reduced through implementation of General Construction Measure 1, which states that Rugraw will delineate the limits of construction, work areas, and multipurpose areas with flagging; and Biological Resources Protection Measure 2, which states that a biological monitor would be present to assist in compliance with measures, including preventing land–disturbing activities outside of flagged areas.

Considering that Sierra Nevada red foxes and their habitat are unlikely to be affected by construction, and with implementation of Rugraw–proposed measures to be implemented as part of the Proposed Project, the potential for indirect effects to habitat for Sierra Nevada red foxes would be considered less than significant.

Construction Impacts – Sierra Nevada Red Fox

- **Level of Significance:** Less Than Significant
- **Mitigation Measures:** None Required

Operations and Maintenance

Ongoing maintenance activities over the term of the license limited to the rights–of–way around Proposed Project facilities would not occur in the vicinity of talus slopes that represent suitable denning habitat for Sierra Nevada red fox. Therefore, effects of ongoing operations and maintenance on Sierra Nevada red fox or their habitats are less than significant.

Operation and Maintenance Impacts – Sierra Nevada Red Fox

- **Level of Significance:** Less Than Significant

- **Mitigation Measures:** None Required

4.7.5.2 Impacts Related to Riparian Habitat and Sensitive Natural Communities

IMPACT 4.7–2: Would the Proposed Project 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?

Sensitive natural communities in the Proposed Project area include riparian habitats, wetlands, and oak woodlands. Provided below is a brief description of potential direct and indirect effects to these habitats.

Construction

Construction of Proposed Project facilities would result in permanent loss of one acre of riparian habitat (16 percent of existing riparian habitat); 0.01 acre of wetland habitat (14 percent of existing wetland habitat), and 7.05 acres of oak woodland habitat (10 percent of existing oak woodland habitat) in the Proposed Project area. General Construction Measure 2 would minimize the potential for Proposed Project impacts to sensitive habitats by limiting ground disturbance and vegetation clearing to the area necessary for construction. In addition, disturbed stream and riparian habitat would be restored to pre–construction conditions and with riparian plantings and/or seeding, where applicable, with seed mixes recommended by CDFW (General Construction Measure 3). As required by the Noxious Weed Management and Revegetation Plan (described in Section 4.7.4.1), revegetated areas will be monitored annually for two years to assess successful establishment of desired vegetation and to determine if additional seed mix and or riparian plantings need to be installed

However, some losses would still occur. Federal and state regulations (e.g., Clean Water Act Section 404; California Wetlands Conservation Policy (Executive Order W–59–93); State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State) impose a “no net less” policy for wetlands. Therefore, loss of 0.01 acre of wetland habitat is potentially significant. To minimize loss of habitat, Rugraw would implement a number of measures to be incorporated into the Proposed Project. This includes development of a Construction Plan (General Construction Measure 1); to be closely coordinated with the development of the SWPPP (General Construction Measure 4). General Construction Measures 2 and 5 limit disturbance areas associated with facility construction, vegetation clearing, and road use and construction. In addition, Recommended Measure BIO–4 states that, as part of the Construction Plan, Rugraw would obtain all required permits, as appropriate, for work within Waters of the U.S. and State, including a Clean Water Act Section 404 permit from the USACE; and a Lake/Streambed Alteration Agreement from CDFW. All conditions of the permits, including mitigation requirements therein for losses of sensitive habitats including wetlands, riparian habitats, and, if applicable, oak woodland habitats, would be required to be implemented as part of the Proposed Project.

With implementation of Rugraw–proposed measures, including the Noxious Weed Management and Revegetation Plan, as well as Recommended Measure BIO–4, the effect associated with loss of sensitive riparian, wetland, and oak woodland habitats would be less than significant.

However, the Construction Plan does not currently include the permits identified in Recommended Measure BIO–4.

Construction Impacts

- **Level of Significance:** Significant and Unavoidable
- **Recommended Measure BIO–4:** Protection of Sensitive Habitats. Rugraw would include the following measure in its Construction Plan (General Construction Measure 1):
  - Rugraw would obtain all required permits, as appropriate, for work within Waters of the U.S. and State of California, including a Clean Water Act Section 404 permit from USACE; and a Lake/Streambed Alteration Agreement from CDFW.
  - All conditions of the permits, including mitigation requirements for losses of sensitive habitats including wetlands, riparian habitats, and, if applicable, oak woodland habitats, would be required to be implemented as part of the Proposed Project.

Operations and Maintenance

The proposed run–of–river operation would affect the seasonal instream flow pattern in the 2.4–mile–long reach of South Fork Battle Creek between the proposed diversion dam (RM 23.0) and powerhouse tailrace (RM 20.6) (bypassed reach), which could potentially affect riparian habitat. The flow pattern would remain unaffected downstream of the Proposed Project's tailrace. Proposed Project operations have potential to affect riparian vegetation if the Proposed Project alters the streamflow regime and disrupts natural processes of sediment scour and deposition. These natural processes can create suitable sites for riparian tree seed germination. However, indirect effects to riparian habitat along the 2.4–mile bypassed reach are expected to be minimal for several reasons. First, the existing stream channel in the bypassed reach is primarily bedrock with the floodplain constrained by canyon walls. Any riparian grasses and trees that could provide canopy cover depend on sediment deposited in bedrock crevices for germination sites. As discussed in *Section 4.6 Biological Resources – Aquatics and Fisheries*, Rugraw will implement the Debris and Sediment Management Plan, which will provide sediment flushing flows to maintain sediment transport dynamics in the bypassed reach. These flows and uncontrolled natural high flows would continue to provide habitat for riparian species establishment. Proposed Project operations would result in slightly steeper declines in the winter snowmelt flow pulse; however, these flows would still provide sufficient soil moisture to promote seed establishment and maintain existing riparian structure.

Considering that that indirect effects to riparian habitats resulting from operations are expected to be minimal, and with implementation of the Debris and Sediment Management Plan, impacts related to riparian habitat or other sensitive natural community would be less than significant.

Operation and Maintenance Impacts

- **Level of Significance:** Less Than Significant Impact
- **Mitigation Measures:** None required

4.7.5.3 Impacts Related to Movement of Wildlife or Wildlife Nursery Sites

IMPACT 4.7–3: Would the Proposed Project interfere substantially with the movement of any native resident or migratory wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?

Construction, Operations, and Maintenance

The Proposed Project area may be used by mammals and birds as a movement corridor. (Refer to *Section 4.6, Biological Resources – Aquatics and Fisheries* for analysis of potential effects to movement of resident and native fish species). The Proposed Project area is not located in a known migration corridor, fawning area, or recognized flyway. The Proposed Project includes construction of facilities within previously undeveloped wildlife habitat, including an above–ground powerhouse (measuring approximately 60 by 90 feet), a substation measuring approximately 40 by 42 feet, and a 12–mile long transmission line. The powerhouse and substation have a limited footprint; lands around the powerhouse and substation would remain open to the movement of wildlife. Therefore, these features would not substantially alter the movement of wildlife. The transmission line, however, could potentially affect movement of avian species through collisions with or electrocution on the transmission line.

Rugraw has incorporated several measures into the Proposed Project to reduce the likelihood of avian injury or mortality from collisions with the transmission line and potential electrocution. The Avian Protection Plan requires Rugraw to design and construct the transmission lines consistent with Avian Power Line Interaction Committee Guidelines and USFWS Avian Protection Plan Guidelines to reduce the risk of avian interactions with the proposed transmission line. Rugraw is also required to develop and implement a Bald Eagle and Raptor Management Plan using USFWS's National Bald Eagle Management Guidelines. The Bald Eagle and Raptor Management Plan, at a minimum, would include the use of species–specific distance buffers, landscape buffers, seasonal restrictions, and additional recommendations to benefit raptors.

With implementation of the Avian Protection Plan and Bald Eagle and Raptor Management Plan, this impact would be considered less than significant.

Construction, Operation, and Maintenance Impacts

- **Level of Significance:** Less Than Significant Impact
- **Mitigation Measures:** None required

4.7.5.4 Impacts Related to Local Policies or Ordinances

IMPACT 4.7–4 Would the Proposed Project conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

Construction, Operations, and Maintenance

The Proposed Project would not conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance, because the Proposed

Project does not occur in an area covered by any of these types of plans. Tehama County has a Voluntary Oak Woodland Management Plan which details oak protection guidelines established by Tehama County in 1994 and updated. As described under Impact 4.7–2 and 4.7–3, the Proposed Project requires removal of 7.05 acres of oak woodland habitat. Given that the Voluntary Oak Woodland Management Plan is entirely voluntary, removal of oak woodland does not represent a conflict.

However, some wetland loss would occur. Tehama County General Plan requires that for each project in which unavoidable removal of wetland habitat or other waters of the U.S. will occur, Tehama County shall require the project proponent to develop a compensation plan prior to construction. Therefore, loss of 0.01 acre of wetland habitat is potentially significant. To minimize loss of habitat, Rugraw would implement a number of measures to be incorporated into the Proposed Project. This includes development of a Construction Plan (General Construction Measure 1); to be closely coordinated with the development of the SWPPP (General Construction Measure 4). General Construction Measures 2 and 5 limit disturbance areas associated with facility construction, vegetation clearing, and road use and construction. In addition, Rugraw has proposed a Biological Resources Protection Measure which avoids streams, wetlands, and pond habitats to the extent possible during construction, and use existing stream and wetland crossings where possible. In addition, Recommended Measure BIO–4 states that, as part of the Construction Plan, Rugraw would obtain all required permits, as appropriate, for work within Waters of the U.S. and State, including a Clean Water Act Section 404 permit from the USACE; and a Lake/Streambed Alteration Agreement from CDFW. All conditions of the permits, including mitigation requirements therein for losses of sensitive habitats including wetlands, riparian habitats, and, if applicable, oak woodland habitats, would be required to be implemented as part of the Proposed Project.

With implementation of Rugraw–proposed measures, including the Noxious Weed Management and Revegetation Plan, as well as Recommended Measure BIO–4, the effect associated with loss of sensitive riparian, wetland, and oak woodland habitats would be less than significant. However, the Construction Plan does not currently include the permits identified in Recommended Measure BIO–4.

Construction, Operation, and Maintenance Impacts

- **Level of Significance:** Significant and unavoidable
- **Recommended Measure BIO–4:** Protection of Sensitive Habitats. Rugraw would include the following measure in its Construction Plan (General Construction Measure 1):
  - Rugraw would obtain all required permits, as appropriate, for work within Waters of the U.S. and State, including a Clean Water Act Section 404 permit from USACE; and a Lake/Streambed Alteration Agreement from CDFW.
  - All conditions of the permits, including mitigation requirements for losses of sensitive habitats including wetlands, riparian habitats, and, if applicable, oak woodland habitats, would be required to be implemented as part of the Proposed Project.

4.7.5.5 Impacts Related to Conservation Plans

IMPACT 4.7–5: Would the Proposed Project conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state Habitat Conservation Plans?

Construction, Operations, and Maintenance

The Proposed Project would not conflict with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or state habitat conservation plan because the Proposed Project does not occur in an area covered by any of these types of plans. Therefore, there would be no impact.

However, for a discussion of the Proposed Project's effect on the Battle Creek Salmon and Steelhead Restoration Project see Section 4.6, *Biological Resources – Aquatics and Fisheries*.

Construction, Operation, and Maintenance Impacts

- **Level of Significance:** No Impact
- **Mitigation Measures:** None required

4.7.6 References

Dittes and Guardino Biological Consulting. 2002. Botanical Resource Investigation Conducted for Proposed Lassen Lodge Hydroelectric Project, Tehama County, California. Field Survey Results, 2002 Season. September 3.

Federal Energy Regulatory Commission. 2018. Final Environmental Impact Statement for Hydropower License, Lassen Lodge Hydroelectric Project, FERC Project Number 12496–002, California. July.

SPI (Sierra Pacific Industries). 2013. Personal communication on February 12, between Dan Ball, Sierra Pacific Industries, Anderson, CA, and Sierra Mars, GIS Analyst, Tetra Tech, Inc., Bothell, WA.

Tehama County. 2009. Tehama County General Plan, 2009–2029. March 2009.

Tetra Tech (Tetra Tech, Inc.). 2013. Wetland Delineation Report, Lassen Lodge Hydroelectric Project, FERC Number 12496, South Fork Battle Creek, Tehama County, CA. October.

Tetra Tech. 2015a. Biological Assessment, Lassen Lodge Hydroelectric Project, FERC Number 12496, South Fork Battle Creek, Tehama County, CA. Prepared for Rugraw, LLC. November.

Tetra Tech. 2015b. Botanical Resources Study Report, Lassen Lodge Hydroelectric Project, FERC Number 12496, South Fork Battle Creek, Tehama County, CA. Prepared for Rugraw, LLC. November.

Tetra Tech. 2015c. Threatened, Endangered, and Sensitive Wildlife Species Habitat Assessment, Lassen Lodge Hydroelectric Project, FERC Number 12496, South Fork Battle Creek, Tehama County, CA. Prepared for Rugraw, LLC. November.

U.S. Fish and Wildlife Service (USFWS). 2011. Revised Recovery Plan for the Northern Spotted Owl. Region 1 USFWS, Portland, Oregon. June 28, 2011.

USFWS. 2020. The Bald and Golden Eagle Protection Act. Accessed September 16, 2020 at www.fws.gov.

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4.8 Cultural Resources

This section discusses potential impacts to cultural resources that could result from construction, operation, and maintenance of the Proposed Project. If necessary, mitigation measures are identified for significant impacts. Tribal resources are addressed in Section 4.18, Tribal Cultural Resources.

Cultural resources are defined as buildings, sites, structures, or objects, each of which may have historical, architectural, archaeological, cultural, or scientific importance. The California Office of Historic Preservation (OHP) defines a cultural resource as "any physical evidence of human activities over 45 years old…" (1995:2).

"Cultural resources" also embody the National Historic Preservation Act's (NHPA) "historic property" and the CEQA "historical resource" and "unique archaeological resource" (see Section 4.8.3.2, State, for definitions of historical and archaeological resources).

The information regarding the impact analysis is based on background research, as well as archaeological and architectural surveys conducted within the Proposed Project's Area Limit (PAL) as detailed in the report *Cultural Resources Inventory, Lassen Lodge Hydro Electric Proposed Project FERC License Number 12496, South Fork Battle Creek, Tehama County, California*, (Farrell et al., 2014, confidential filing), and the *Historic Properties Management Plan Lassen Lodge Hydro Electric Project, FERC License Number 12496, South Fork Battle Creek, Tehama County, California* (Farrell et al., 2014, confidential filing).

4.8.1 Environmental Setting

The area surrounding the Proposed Project has a rich prehistory, ethnography, and history as part of the South Battle Creek region. The general context below provides an understanding of the types, origin, and importance of cultural resources that have been documented in the vicinity of the Proposed Project.

4.8.1.1 Proposed Project Area Limits

As part of the NHPA Section 106 process, FERC must consider whether the issuance of an original license would affect any historic property within the Proposed Project's Area of Potential Effects (APE). The Proposed Project's APE was determined in consultation with the SHPO and includes the area where the Proposed Project could directly or indirectly cause alterations in the use or character of a historic property. Under CEQA, the PAL has a similar definition as the APE with regard to effects on historical resources, and in most projects the PAL and the APE cover an identical area. For the Proposed Project, the PAL and APE are identical and include the land within the Proposed Project boundary, plus areas outside the boundary where project operations may affect the character or use of historical resources or Tribal Cultural Resources (TCR) (see Section 4.18, Tribal Cultural Resources). Currently, as there are no documented TCRs or other resources outside the Proposed Project boundary that may be affected by the Project, the PAL and APE are the same as the Proposed Project Boundary. Figure 2–1, Proposed Project (Maps 1 through 16) show this boundary.

The final Section 106 APE and the PAL for the Proposed Project was approved by the SHPO on November 15, 2015. The PAL is approximately 250 acres and includes all areas where Proposed Project activities would occur:

- Diversions and intake structure: (2 acres)
- Powerhouse: (3.5 acres)
- Transition structure: (1 acre)
- Multipurpose areas: (3.2 acres)
- Potential tower location: (2.9 acres)
- 120 foot–wide by 12–mile–long transmission line: (174.5 acres)
- 120 foot–wide by 2.4–mile–long penstock and pipeline: (34.9 acres)
- 120–foot–wide by 0.4–mile–long station service line: (5.8 acres)
- Transmission line pulling areas

Additionally, the PAL includes the entire boundary of archaeological sites within the area of direct impacts, as well as any areas that could be indirectly affected by the Proposed Project. The vertical PAL mirrors the vertical APE and extends as much as 60 feet above the ground (for new poles) and 1 to 20 feet below the ground, depending on the activity.

The following section provides an overview of the general cultural landscape of the South Battle Creek region. A review of the archaeological and ethnographic records provides the evidence showing the change of settlement strategies and subsistence technology over time and how that corresponds with changes in the natural environment. The cultural sequence in the area has been well established and the following is a brief summary of that chronology.

4.8.1.2 Prehistoric Overview

Prior to 12,500 years ago, the climate from the late glacial Pleistocene was cooler and the sagebrush steppe vegetation of the Southern Cascade region was different compared to pine–dominated forest of the post glacial climates of the Holocene. Around 3,100 years ago, the vegetation transitioned to the fir forests we see in modern times (West et al., 2007:30). The Native Americans deliberately set fire to the vegetation communities to encourage growth of food and fiber (basketry, twine, etc.) plant resources. Additionally, these fires also improved hunting conditions, the gathering of grasshoppers and other insects, and was also used for ceremonial purposes (Schultz, 1954; Lewis, 1990).

The cultural prehistory for the southern Cascade foothills has been formulated based on the early archaeological investigations at Kinsley Cave (CA–TEH–1) and Payne Cave (CA–TEH–193) by Baumhoff (1955, 1957). The two–phase sequence (early–Kingsley Complex and later–Mill Creek Complex) developed by Baumoff was later expanded and refined by Johnson and Theodoratus (1984), Greenway (1982), and Wiant (1981). These studies and subsequent analyses of materials recovered from multiple sites and rock shelters led to the development of a five–phase chronological sequence.

The five–phase sequence is comprised of the Deadman Complex, the Kingsley Complex, the Dye Creek Complex, the Mill Creek Complex, and the Proto–Historic Period (Ethnographic Yana). The following provides a brief explanation of each phase:

- *The Deadman Complex*, as defined by Greenway (1982), spanned from 4500 BP to 3000 BP (2550 to 1050 BCE), and is characterized by large side–notched and stemmed projectile points as well as unifacially flaked leaf– shaped "foliates," flaked tools, groundstone, beads and pendants, and trade networks. The primary site types include open sites and rock shelters.
- *The Kingsley Complex* lasted from 3000 BP to 1500 BP (1050 BCE to 450 CE) and, in addition to the *Olivella* shell beads, spatulate and bone tools, the projectile points are characterized by primarily basalt–made large–stemmed and corner–notched varieties. Groundstone tools (e.g., flat–ended pestles, hopper mortars, metates, and shaped hand stones) are also present with single– and multi–family structures at this time. Also present during this time are tightly flexed burials with associated ceremonial items.
- *The Dry Creek Complex* spanned 1500 BP to 500 BP (450 CE to 1450 CE) contains rectangular and barrel *Olivella* shell beads along with large circular *Haliotis* ornaments and perforated freshwater clamshell ornaments. Groundstone tools (e.g., hopper mortar and flat–ended pestles) along with deer ulna bone artifacts accompany the medium– to large–sized corner–notched, side–notched, serrated styles, and other similar typed Gunther Barbed series projectile points. *The Dry Creek Complex lithic tool kit* primarily contains obsidian (mainly from the Tuscan area) and chert as the dominant raw material for tool manufacture. The high density of archaeological sites associated with the Dry Creek Complex include Mill, Antelope, Deer, and Dye Creeks within Yana territory (Watts and Dugas, 1998). The Jelly Mound site (CA–TEH–1783), located approximately six to eight miles southwest of the PAL, produced radiocarbon dates from hearths and obsidian hydration dates that were associated with the Dry Creek Complex (Sundahl, 2001).
- *The Mill Creeks Complex* began 500 years ago and lasted until pre–gold rush times in California (circa 1845) and is characterized by Southern Cascade serrated, Desert series side–notched, and small triangular projectile points primarily from obsidian. The other items in the artifact assemblage include whole spire–lopped *Olivella* shell beads, *Glycymeris* shell beads, clam shell disk beads, groundstone implements, and magnesite cylinder beads. The rock shelters along Mill Creek that typify this complex produced arrow fragments made from elderberry (Watts and Dugas, 1998). Basketry appeared in the archaeological record in twined and coiled forms along with twined cordage. This complex is also characterized by tightly flexed burials, pitted boulder petroglyphs, and small single–family structures with 3 to 4–meter diameter rock rings with bush, deerskin, or bark. Johnson (1994) noted large earth–covered ceremonial or communal structures.

The five–phase sequence was concluded with the Proto–Historic Period (circa 1846 to 1911), which occurred after Historic Contact (circa 1845). The Proto–Historic Period included traditional type artifacts fashioned from Euro–American introduced materials, such as metal and glass. Glass projectile points and scrapers as well as iron nail harpoon toggles, glass beads, and white porcelain trade beads are also part of the Proto–Historic Period. In addition, several items are present including small triangular serrated obsidian projectile points, slab metates, manos, hopper mortars, flat ended pestles, white spire–lopped *Olivella* shell beads, whole *Haliotis* shells, *Glycymeris* and *Dentelia* shell beads, clam shell discs, magnesite cylinders, wooden tubular pipes, large pine nut beads, and twined basketry characterize the Proto–Historic Period

(Watts and Dugas 1998). Similar to the Mill Creek Complex, single–family structures 3 to 4 m in diameter covered with bark or brush, pitted boulder petroglyphs, and tightly flexed burials are noted for this period, though cremations are also occurring as well.

4.8.1.3 Historic Overview

European–American (or Euro–American) fur trappers and traders came to the lands that comprise modern Tehama County in the 1830s. This time period saw a steady increase in population to the area as portions of Tehama County were divided into seven land grants and given to early settlers by Mexican governor Micheltorena in 1844. The Mexican land grants included Rancho de los Molinos, Rancho las Flores, Rancho Rio de los Barrendos (or Rancho el Primer), Rancho de la Barranca Colorado, Rancho Capay, Rancho Bosqe Jo, and Rancho Saucos (Tehama County, 2011; Lewis Publishing Company, 1891). The closest land grant to the Proposed Project area is Rancho Rio de los Berrendos, located approximately 30 miles to the west.

On September 9, 1850, California became the 31st state of the United States. Tehama County was formed in 1856 from the counties of Butte, Colusa, and Shasta. The discovery of gold in Coloma in 1848 brought large numbers of fortune seekers and entrepreneurs to the area. At that time, agriculture, ranching, and logging were the primary sources of income for the area and attracted residents of European, Mexican, and Chinese descent (Tehama County, 2011).

The late 1850s saw the establishment of several sawmills along Payne's and Digger Creeks that led to the development of the local lumber industry in the 1860s. Homesteaders soon began ranching operations in the Digger Creek area and the settlement of Manton was established by the late 19th century. The first property owners in the vicinity of the Proposed Project area comprised homesteaders and the Central Pacific Railroad, the latter of which patented much of the area in 1895.

George Wheeler and Edward Hazen and their families owned land in Manton in the 1870s totaling 1,250 acres. According to General Land Office (GLO) maps, Section 2 of Township 29 North, Range 1 East, included an apple orchard and a structure labeled as George W. Hazen's House (GLO, 1875; Luning, 1903; Tehama County, 2013; Oakley–McFarlin, 2008). Additionally, the 1903 Tehama County Map shows George W. Hazen owned property immediately south of Hazen Road in Section 34 of Township 30 North, Range 1 East (GLO, 1875; Luning, 1903).

The Lumber Industry in Tehama County (Late–19th and Early–20th Centuries)

Early trading companies began harvesting lumber from California and shipping the logs to Sacramento and as far as Alaska prior to the Gold Rush. The discovery of gold during the 1840s and the subsequent influx of people increased the demand for forest products which were being used for fuel, construction, and mining purposes (Kraft and Woodrum, 2005). Due to the abundance of tree species in Tehama County, the lumber industry served as its primary economic resource during the 19th century.

The Sierra Flume and Lumber Company and the Sierra Lumber Company were the two major lumber companies in Tehama County during the late–19th century. Starting in 1876, these companies constructed large and complex lumber operations that included sawmills, factories, lumber yards, and miles of flumes within Tehama County. The Sierra Flume and Lumber Company acquired several of the smaller companies, including the Sierra Lumber Company,

during its operational history. In 1902, the Sierra Lumber Company started the Diamond Match Company (Hutchinson, 1956).

The “New” Champion Mill, constructed in 1876, was the most important mill built by the Sierra Flume and Lumber Company. The mill spurred the growth of the community of Lyonsville, named for Darwin B. Lyon who was the first superintendent of the New Champion Mill (Tehama County, 2011). The community grew to include a post office, school, social halls, a warehouse, and hotels settled on an escarpment between the north and south fork of Antelope Creek. The community was abandoned in 1918. Portions of the Last Ditch, associated with the New Champion Mill, are within the PAL.

Wagon roads and steamboats were the primary modes of lumber transport to larger commercial areas during the late–19th century. Flumes and ditches, however, were also used as a less expensive means of conveying lumber from sawmills to processing plants. Many of the more well–known ditches and flumes were constructed in the 1860s and in use through the 1870s. Well–known flumes such as the “Blue Ridge Flume” and the “Empire Flume” were constructed and/or owned by the Sierra Flume and Lumber Company and the Blue Ridge Flume Company. Flumes were constructed with a V–shape structure that allowed them to convey lumber from sawmills to various processing locations. After processing, the lumber was eventually conveyed to distribution points like Red Bluff where lumber could be loaded onto wagons or steamboats.

Many of the settlements, structures, features, roads, and trails present on the landscape in Tehama County are related to its historic lumber industry. The lumber industry was also supported by wagon stops, inns, and lodges that continued to be popular well into the 20th century.

4.8.1.4 Roads and Lodges in Tehama County

Highway 36

The 1850s wagon roads and stagecoach lines formed the early transportation routes from Red Bluff to other communities along the Sacramento River. While the introduction of the railroad in the 1870s facilitated the expansion of transportation of both passengers and goods, local roads still played a vital role in Tehama County’s development. In the late 1890s California developed a state highway system, managed by the State Bureau of Highways, which recommended the construction of a highway between Sacramento and Red Bluff (Hardwick and Holtgrieve, 1996).

One of the earliest roads in eastern Tehama County was constructed in 1863. According to historic maps, this wagon road (often referred to as Old County Wagon Road) spanned from Red Bluff to Battle Creek Meadows. The road brought campers and vacationers to the mountain areas of eastern Tehama County to escape the sweltering summer heat of the valley below.

Construction of Highway 36 began in 1907 with Legislative Route Number (LRN) 36 from modern–day Oroville southeast to Collins Lake (California Highways, 2012). The route was extended east and west following Tehama County Wagon Road alignment in 1913. By 1921, LRN 36 was paved and expanded to its present–day alignment, adjacent to Lassen Lodge at Paynes Creek. The route is depicted on historic maps dating to 1926 and has extended through the eastern portion of Tehama County; however, early maps depict portions of the roadway slightly north of its current alignment (Luning, 1926).

Until 1964, segments of State Route (SR) 36 followed other state highways, such as SR 21 from Red Bluff to Mineral (State of California, 1934). Other portions of SR 36 in Tehama County had the designation of LRN 3 and LRN 35. Following the 1964 change to the current highway naming scheme, these routes were combined under SR 36. Nonetheless, from its earliest days as a wagon road to its contemporary paved highway alignment, this roadway was an important passage for the transportation of goods and travelers vacationing in eastern Tehama County.

Ponderosa Way

In 1929, CAL FIRE proposed a continuous firebreak along the western edge of California's Sierra Nevada. This was followed by a prioritization of protecting the valuable mountainous timber resources (Thornton, 1995). The firebreak route was planned to roughly follow the line between chaparral and timber and would serve as a permanent fire defense line for National Forest lands.

The Civilian Conservation Corps (CCC) program, instituted in 1933 by the federal government as an unemployment mitigation program, allowed for the implementation of this firebreak. As the largest CCC project undertaken in California, the Ponderosa Fire Break/Truck Trail/Ponderosa Way was planned to span 768 miles from Shasta Bear Lookout, through Tehama County, and south to the Kern County border near Bakersfield. Following a survey in 1933, 440 miles of this firebreak was completed by May 1934 (Otis et al., 1986). While some areas required dynamite and jackhammers to get through the bedrock, the route followed existing roads and trails wherever possible, leading to frequent and confusing name changes. This helped Ponderosa Way receive its moniker: "the longest invisible federal road in America" (McCubbins, 2010).

Traveler's Stops and Lodges in East Tehama County

Paynes Creek is located approximately 20 miles northeast of Red Bluff, and approximately 11 miles east of the Proposed Project area. The town began as a sawmill at Mill Creek in the late 1850s and grew into a stage stop along the wagon route between the towns of Red Bluff and Manton. Other historical stage and wagon stops included ones at Morgan Springs near Mill Creek, Inskip Lodge, and the most well–known was Mineral Lodge.

While commonly known as Lassen Lodge, the lodge was known by different names over the years and in local lore. The lodge started was opened in 1939 by Sylvia and Bill Swart and contained a coffee shop, tap room, a dance hall, and rumpus room. The lodge became a tourist destination, not just a rest stop for travelers. Eventually, private cabins were built to handle all the people. The resort grew to encompass a full section of land (640 acres); but, by the late 1960s, the resort fell into disrepair and was foreclosed. Land lots were sold off and the lodge never reopened.

These wagon stops usually had summer cabins, motels, and stores that were popular for travelers heading to Lassen Volcanic National Park. Some of these wagon stops became communities and small towns with post offices, schools, dance halls, and, eventually, gas stations. Other places along the Old County Wagon Road (SR 36) were just rest and refueling stations.

4.8.2 Regulatory Setting

4.8.2.1 Federal

National Environmental Policy Act

The National Environmental Policy Act (NEPA) establishes the federal policy of protecting important historic, cultural, and natural aspects of our national heritage during federal project planning. All federal or federally assisted projects requiring action pursuant to section 102 of NEPA must take into account impacts on cultural resources (42 U.S.C. section 4321–4347).

The Council on Environmental Quality (CEQ) Guidelines provided a standard for determining the significance of impacts analyzed under NEPA. Significance as used in NEPA requires considering impacts in terms of both context and intensity (40 C.F.R. section 1508.27).

Context means that the action must be analyzed in terms of society as a whole, the affected region and interests, and the local setting. The span of the context should be scaled to match the action. For larger actions, a wider context is appropriate. For smaller site–specific actions, the local context may be sufficient. Both the short– and long–term impacts of an action are relevant to this analysis (40 C.F.R. section 1508.27[a]).

Intensity is defined as the severity of an impact. The CEQA Guidelines direct federal agencies to consider cultural resources when evaluating intensity. Specific factors that may affect the intensity of an impact include its proximity to historical or cultural resources, the potential for impacts on National Register of Historic Places (NRHP)–eligible or listed properties, and the potential for loss or destruction of significant scientific, cultural, or historical resources (40 C.F.R. section 1508.27[b]).

Collectively, these considerations mean that NEPA analysis should identify the potential for an action to adversely affect resources that are or may be eligible for listing on the NRHP.

Section 106 of the National Historic Preservation Act of 1966

Section 106 of the NHPA (Section 106) requires that every federal agency “take into account” how each of its undertakings could affect historic properties. Historic properties are districts, sites, buildings, structures, traditional cultural properties (TCPs), and objects significant in American history, architecture, engineering, and culture that are eligible for or listed in the NRHP. Historic properties are resources listed on or eligible for listing on the NRHP (36 C.F.R. section 800.16(l)(1)). A property may be listed in the NRHP if it meets criteria provided in the NRHP regulations (36 C.F.R. section 60.4).

The quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association (further discussed below in Section 18.2.2.1) and:

(A) That are associated with events that have made a significant contribution to the broad patterns of our history;

(B) That are associated with the lives of persons significant in our past;

(C) That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess artistic value, or that represent a

significant and distinguishable entity whose components may lack individual distinction; or

(D) That have yielded, or may be likely to yield, information important in prehistory or history.

Some property types do not typically qualify for the NRHP. However, these properties may qualify if they fall into one or more of the following criteria considerations. These considerations consist of the following (36 C.F.R. section 60.4).

- A religious property deriving primary significance from architectural or artistic distinction or historical importance;
- A building or structure removed from its original location but which is significant primarily for architectural value, or which is the surviving structure most importantly associated with a historic person or event;
- A birthplace or grave of a historical figure of outstanding importance if there is no appropriate site or building directly associated with his productive life;
- A cemetery which derives its primary significance from graves of persons of transcendent importance, from age, from distinctive design features, or from association with historic events;
- A reconstructed building when accurately executed in a suitable environment and presented in a dignified manner as part of a restoration master plan, and when no other building or structure with the same association has survived;
- A property primarily commemorative in intent if design, age, tradition, or symbolic value has invested it with its own exceptional significance; or
- A property achieving significance within the past 50 years if it is of exceptional importance.

The Section 106 review process typically consists of the following major steps:

1. Identify the federal agency undertaking.
2. Initiate Section 106 process.
3. Identify historic properties.
4. Assess adverse effects.
5. Resolve adverse effects.

Section 106 defines an adverse effect as an effect that alters, directly or indirectly, the qualities that make a resource eligible for listing in the NRHP (36 C.F.R. section 800.5(a)(1)). Consideration must be given to the property's location, design, setting, materials, workmanship, feeling, and association, to the extent that these qualities contribute to the integrity and significance of the resource. Adverse effects may be direct and reasonably foreseeable, or may be more remote in time or distance (36 C.F.R. section 800.5(a)(1)).

Under section 304(a) of the NHPA, "[t]he head of a Federal agency … shall withhold from disclosure to the public, information about the location, character, or ownership of a historic resource if the Secretary and the agency determine that disclosure may … risk harm to the historic resources …."

Native American Graves Protection and Repatriation Act

The Native American Graves Protection and Repatriation Act (NAGPRA) provides a process for federal agencies to return certain Native American cultural items to lineal descendants and culturally affiliated Indian tribes. NAGPRA defines the ownership of Native American human remains and funerary materials excavated on lands owned or controlled by the federal government. NAGPRA establishes a hierarchy of ownership rights for Native American remains and objects identified on these lands (25 U.S.C. section 3002):

- Where the lineal descendants can be found, the lineal descendants own the remains or objects.
- Where the lineal descendants cannot be found, the remains or objects belong to the Indian tribe or Native Hawaiian organization on whose land the remains were found.
- If the remains are discovered on other lands owned or controlled by the federal government and the lineal descendants cannot be determined, the remains belong to the Indian tribe or Native Hawaiian organization that is culturally affiliated with the remains, or the tribe that aboriginally occupied the land where the remains were discovered.

Intentional excavation of Native American human remains or objects on lands owned or controlled by the federal government may occur only under the following circumstances (25 U.S.C. section 3002 (c)):

- With a permit issued under the Archaeological Resources Protection Act (16 U.S.C. section 470cc);
- After documented consultation with the relevant tribal or Native American groups; and
- Ownership and disposition follows NAGPRA for all human remains and associated artifacts.

NAGPRA also provides guidance on inadvertent discoveries of Native American or Hawaiian human remains on lands owned or controlled by the federal government. When an inadvertent discovery on these lands occurs in association with construction, construction must cease. The party that discovers the remains must notify the relevant federal agency, and the remains must be transferred according the ownership provisions above (25 U.S.C. section 3002(d)).

The Archaeological Resources Protection Act

The Archaeological Resources Protection Act (ARPA) requires a permit for intentional excavation of archaeological materials on federal lands (16 U.S.C. section 470ee (a)). The federal agency that owns or controls the land may dispense permits for excavation as provided in the ARPA regulations (43 C.F.R. section 7.5). The permit may require notice to affected Indian tribes (43 C.F.R. section 7.7), and compliance with the terms and conditions provided in the ARPA regulations (43 C.F.R. section 7.9).

4.8.2.2 State

CEQA

Under CEQA, public agencies must consider the effects of their actions on both "historical resources" and "unique archaeological resources." As stated in PRC section 21084.1, a "project that may cause a substantial adverse change in the significance of an historical resource is a project that may have a significant effect on the environment." PRC section 21083.2 requires agencies to determine whether proposed projects would have effects on "unique archaeological resources."

"Historical resource" is a term with a defined statutory meaning (PRC, section 21084.1; CEQA Guidelines, section 15064.5(a)). The term embraces any resource listed in or determined to be eligible for listing in the California Register of Historical Resources (CRHR). The CRHR includes resources listed in or formally determined eligible for listing in the NRHP, as well as some California State Landmarks and Points of Historical Interest.

Properties of local significance that have been designated under a local preservation ordinance (local landmarks or landmark districts) or that have been identified in a local historical resources inventory may be eligible for listing in the CRHR and are presumed to be "historical resources" for purposes of CEQA (PRC, section 5024.1; CEQA Guidelines, section 4850). Unless a resource listed in a survey has been demolished, lost substantial integrity, or a preponderance of evidence indicates that it is otherwise not eligible for listing, a lead agency should consider the resource to be potentially eligible for the CRHR.

In addition to assessing whether historical resources potentially impacted by a project are listed or have been identified in a survey process (PRC, section 5024.1, subd. (g)), lead agencies have a responsibility to evaluate them against the CRHR criteria prior to making a finding as to a project's impacts to historical resources (PRC, section 21084.1; CEQA Guidelines section 15064.5, subd. (a)(3)). Under section 15064.5, subdivision (a) of the CEQA Guidelines, a historical resource is defined as any object, building, structure, site, area, place, record, or manuscript that:

- Is historically or archeologically significant, or is significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political or cultural annals of California; and

Meets any of the following criteria:

- Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;
- Is associated with the lives of persons important in our past;
- Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or
- Has yielded, or may be likely to yield, information important in prehistory or history.

PRC section 5024 also requires consultation with the OHP when a project may impact historical resources located on state–owned land.

For historic structures, CEQA Guidelines section 15064.5, subdivision (b)(3), states that a project that follows the Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings, or the Secretary of the Interior's Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings (1995) will mitigate impacts to a less–than–significant level. Potential eligibility also rests upon the integrity of the resource. Integrity is defined as the retention of the resource's physical identity that existed during its period of significance. Integrity is determined through considering the setting, design, workmanship, materials, location, feeling, and association of the resource.

As noted above, CEQA also requires lead agencies to consider whether projects will impact "unique archaeological resources." PRC section 21083.2, subdivision (g), states that a "unique archaeological resource" means an archaeological artifact, object, or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, a high probability exists that it meets any of the following criteria:

- Contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information;
- Has a special and particular quality such as being the oldest of its type or the best available example of its type; or
- Is directly associated with a scientifically recognized important prehistoric or historic event or person.

Treatment options under PRC section 21083.2 include activities that preserve such resources in place in an undisturbed state. Other acceptable methods of mitigation under PRC section 21083.2 include excavation and curation or study in place without excavation and curation (if the study finds that the artifacts would not meet one or more of the criteria for defining a "unique archaeological resource").

Advice on procedures to identify cultural resources, evaluate their importance, and estimate potential effects is given in several agency publications such as the series produced by the Governor's Office of Planning and Research. The technical advice series produced by this office strongly recommends that Native American concerns and the concerns of other interested persons and corporate entities, including, but not limited to, museums, historical commissions, associations and societies, be solicited as part of the process of cultural resources inventory. In addition, California law protects Native American burials, skeletal remains, and associated grave goods regardless of their antiquity and provides for the sensitive treatment and disposition of those remains.

Health and Safety Code section 7050.5, subdivision (b), provides protocols when human remains are discovered:

> In the event of discovery or recognition of any human remains in any location other than a dedicated cemetery, there will be no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent remains until the coroner of the county in which the human remains are discovered has determined, in accordance with Chapter 10 (commencing with Section 27460) of Part 3 of Division 2 of Title 3 of the Government Code, that the remains are not subject to the provisions of Section 27492 of the Government Code or any other related provisions of law concerning investigation of

> the circumstances, manner and cause of death, and the recommendations concerning treatment and disposition of the human remains have been made to the person responsible for the excavation, or to his or her authorized representative, in the manner provided in Section 5097.98 of the Public Resources Code.

CEQA Guidelines section 15064.5, subdivision (e), requires that excavation activities be stopped whenever human remains are uncovered and that the county coroner be called in to assess the remains. If the county coroner determines that the remains are those of Native Americans, the NAHC must be contacted within 24 hours. At that time, the lead agency must consult with the appropriate Native Americans, if any, as timely identified by the NAHC. PRC section 15064.5 directs the lead agency (or applicant), under certain circumstances, to develop an agreement with the Native Americans for the treatment and disposition of the remains.

In addition to the mitigation provisions pertaining to accidental discovery of human remains, the PRC also requires a lead agency to make provisions for the accidental discovery of historical or archaeological resources. According to PRC section 15064.5, subdivision (f), these provisions should include "an immediate evaluation of the find by a qualified archaeologist. If the find is determined to be a historical or unique archaeological resource, contingency funding and a time allotment sufficient to allow for implementation of avoidance measures or appropriate mitigation should be available. Work could continue on other parts of the building site while historical or unique archaeological resource mitigation takes place." PRC section 5024 requires consultation with the OHP when a project may impact historical resources located on state–owned land.

Paleontological resources are classified as nonrenewable scientific resources and are protected by state statute. (PRC, section 5097.5; CEQA Guidelines, Appendix G.) No state or local agencies have specific jurisdiction over paleontological resources. No state or local agency requires a paleontological collecting permit to allow for the recovery of fossil remains discovered as a result of construction–related earth moving on state or private land in a project site.

Mitigation Requirements for Archaeological Resources Qualifying as Historical Resources

As set forth in CEQA Guidelines section 15064.5, subdivision (c), special rules apply where a lead agency is not certain at first whether an archaeological resource qualifies as either a "historical resource" or a "unique archaeological resource." That section provides that "[w]hen a project will impact an archaeological site, a lead agency shall first determine whether the site is an historical resource… If a lead agency determines that the archaeological site is an historical resource," the resource shall be subject to the rules set forth above regarding historical resources. In addition, according to CEQA Guidelines section 15126.4, subdivision (b):

> [p]ublic agencies should, whenever feasible, seek to avoid damaging effects on any historical resource of an archaeological nature. The following factors shall be considered and discussed in an EIR for a project involving such an archaeological site:
>
> (A) Preservation in place is the preferred manner of mitigating impacts to archaeological sites. Preservation in place maintains the relationship between artifacts and the archaeological context. Preservation may also avoid conflict with religious or cultural values of groups associated with the site.
>
> (B) Preservation in place may be accomplished by, but is not limited to, the following:
>
> 1. Planning construction to avoid archaeological sites;

2. Incorporation of sites within parks, greenspace, or other open space;
3. Covering the archaeological sites with a layer of chemically stable soil before building tennis courts, parking lots, or similar facilities on the site; or
4. Deeding the site into a permanent conservation easement.

Thus, although PRC section 21083.2, in dealing with "unique archaeological sites," provides for specific mitigation options "in no order of preference," CEQA Guidelines section 15126.4, subdivision (b), in dealing with "historical resources of an archaeological nature," provides that "[p]reservation in place is the preferred manner of mitigating impacts to archaeological sites."

For archaeological resources that qualify as historical resources, "data recovery" is an unfavorable form of mitigation compared with "preservation in place." Yet "[w]hen data recovery through excavation is the only feasible mitigation, a data recovery plan, which makes provisions for adequately recovering the scientifically consequential information from and about the historical resource, shall be prepared and adopted prior to any excavation being undertaken. Such studies shall be deposited with the California Historical Resources Regional Information Center." Moreover, "[i]f an artifact must be removed during project excavation or testing, curation may be an appropriate mitigation." (CEQA Guidelines section 15126.4, subd. (b)(3)(C).)

> Data recovery shall not be required[, however,] for an historical resource [as with a unique archaeological resource] if the lead agency determines that testing or studies already completed have adequately recovered the scientifically consequential information from and about the archaeological or historical resource, provided that the determination is documented in the EIR and that the studies are deposited with the California Historical Resources Regional Information Center.
> (CEQA Guidelines section 15126.4, subd. (b)(3)(D).).

With respect to both historical resources and unique archaeological resources, "a lead agency should make provisions for… resources accidentally discovered during construction. These provisions should include an immediate evaluation of the find by a qualified archaeologist. If the find is determined to be an historical or unique archaeological resource, contingency funding and a time allotment sufficient to allow for implementation of avoidance measures or appropriate mitigation should be available. Work could continue on other parts of the building site while historical or unique archaeological resource mitigation takes place." (CEQA Guidelines, section 15064.5, subd. (f).)

Mitigation for Unique Archaeological Resources

If a lead agency determines that "an archaeological site does not meet the criteria" for qualifying as an historical resource "but does meet the definition of a unique archeological resource…, the site shall be treated in accordance with the provisions of [PRC] section 21083.2." (CEQA Guidelines, section 15064.5, subd. (c)(3).) Section 21083.2 of the PRC contains the special rules for mitigation for "unique archaeological resources." These rules do not apply if the archaeological resource is an historical resource. (CEQA Guidelines section 15064.5, subd. (c)(1).) PRC section 21083.2 states:

(b) If it can be demonstrated that a project will cause damage to a unique archaeological resource, the lead agency may require reasonable efforts to be made to permit any or all of these resources to be preserved in place or left in an undisturbed state. Examples of

that treatment, in no order of preference, may include, but are not limited to, any of the following:

1. Planning construction to avoid archaeological sites.
2. Deeding archaeological sites into permanent conservation easements.
3. Capping or covering archaeological sites with a layer of soil before building on the sites.
4. Planning parks, greenspace, or other open space to incorporate archaeological sites.

(d) Excavation as mitigation shall be restricted to those parts of the unique archaeological resource that would be damaged or destroyed by the project. Excavation as mitigation shall not be required for a unique archaeological resource if the lead agency determines that testing or studies already completed have adequately recovered the scientifically consequential information from and about the resource, if this determination is documented in the environmental impact report.

If, however, "an archaeological resource is neither a unique archaeological nor an historical resource, the effects of the project on those resources shall not be considered a significant effect on the environment. It shall be sufficient that both the resource and the effect on it are noted in the Initial Study or EIR, if one is prepared to address impacts on other resources, but they need not be considered further in the CEQA process" (CEQA Guidelines, section 15064.5, subd. (c)(4)).

California Public Resources Code, Duties of State Agencies

California state agencies must provide the OHP an inventory of all state–owned structures older than 50 years of age under its jurisdiction that are listed in or that may be eligible for inclusion in the NRHP or are registered or that may be eligible for registration as a state historical landmark. (PRC, section5024, subd. (a).) The OHP compiles these lists into a master list. (PRC, section 5024, subd. (d)).

State agencies must provide notice to the State Historic Preservation Officer early in the planning process if the agency intends to alter or demolish resources on the master list. (PRC, section 5024.5, subd. (a)). The State Historic Preservation Officer has 30 days to respond after receiving notice. (*Ibid.*) If the State Historic Preservation Officer determines that the action will have an adverse effect on a listed historical resource, the agency must adopt prudent and feasible measures to mitigate or eliminate the adverse effects. (PRC, section 5024.5, subd. (b)).

Discoveries of Human Remains under California Environmental Quality Act Public Law

California law sets forth special rules that apply where human remains are encountered during project construction. These rules are set forth in CEQA Guidelines section 15064.5, subdivision (e) as follows:

In the event of the accidental discovery or recognition of any human remains in any location other than a dedicated cemetery, the following steps should be taken:

(1) There shall be no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent human remains until:

(A) The coroner of the county in which the remains are discovered must be contacted to determine that no investigation of the cause of death is required [see Health & Safety Code, section 7050.5], and

(B) If the coroner determines the remains to be Native American:

1. The coroner shall contact the [NAHC] within 24 hours.
2. The [NAHC] shall identify the person or persons it believes to be the most likely descended from the deceased Native American.
3. The most likely descendent may make recommendations to the landowner or the person responsible for the excavation work, for means of treating or disposing of, with appropriate dignity, the human remains and any associated grave goods (as provided in Public Resources Code section 5097.98), or

(2) Where the following conditions occur, the landowner or his authorized representative shall rebury the Native American human remains and associated grave goods with appropriate dignity on the property in a location not subject to further subsurface disturbance.

(A) The [NAHC] is unable to identify a most likely descendent or the most likely descendent failed to make a recommendation within 24 hours after being notified by the commission.

(B) The descendant identified fails to make a recommendation; or

(C) The landowner or his authorized representative rejects the recommendation of the descendant, and the mediation by the [NAHC] fails to provide measures acceptable to the landowner.

California Native American Graves Protection and Repatriation Act

Health and Safety Code sections 8010 and 8011 establish a state repatriation policy that is consistent with and facilitates implementation of NAGPRA. This policy requires that all California Indian human remains and cultural items be treated with dignity and respect and encourages voluntary disclosure and return of remains and cultural items by publicly funded agencies and museums in California. It also provides for mechanisms to aid California Indian tribes, including non–federally recognized tribes, in filing repatriation claims and getting responses to those claims.

Confidentiality Considerations

CEQA and the California Public Records Act (Government Code section 6250 et seq.) restrict the amount of information regarding cultural resources that can be disclosed in an EIR in order to avoid the possibility that such resources could be subject to vandalism or other damage (*Clover Valley Foundation v. City of Rocklin* (2011) 197 Cal.App.4th 200, 219). The CEQA Guidelines prohibit an EIR from including “information about the location of archaeological sites and sacred lands, or any other information that is subject to the disclosure restrictions of Section 6254 of the Government Code.” (CEQA Guidelines, sections 15120, subd. (d).) In turn, Government Code section 2654 lists as exempt from public disclosure any records “of Native American graves, cemeteries, and sacred places and records of Native American places,

features, and objects described in sections 5097.9 and 5097.933 of the Public Resources Code maintained by, or in the possession of, the NAHC, another state agency, or a local agency." (Gov. Code, section 6254, subd. (r)).

> *Public Resources Code sections 5097.9 and 5097.993 list the Native American places, features, and objects, the records of which are not to be publicly disclosed under the California Public Records Act, including:* any Native American sanctified cemetery, places of worship, religious or ceremonial site, or sacred shrine located on public property" (PRC, *section* 5097.9) and a Native American historic, cultural, or sacred site, that is listed or may be eligible for listing in the California Register of Historic Resources …, including any historic or prehistoric ruins, any burial ground, any archaeological or historic site, any inscriptions made by Native Americans at such a site, any archaeological or historic Native American rock art, or any archaeological or historic feature of a Native American historic, cultural, or sacred site.…
> (PRC, *section* 5097.993, subd. (a)(1))

The California Public Records Act also generally prohibits disclosure of archaeological records. Government Code section 6254.10 provides:

> Nothing in [the Public Records Act] requires disclosure of records that relate to archaeological site information and reports maintained by, or in the possession of … a local agency, including the records that the agency obtains through a consultation process between a California Native American tribe and a state or local agency.

These authorities prohibit the disclosure of records and information concerning certain of the region's archeological, cultural, and historic resources in this EIR. Confidentiality of the site locations of certain archaeological, cultural, and historic resources found in the region is necessary to prevent vandalism to the resources. Public release of information on the sites may allow their discovery by trespassers, leading to potential looting. As a result, specific descriptions of certain of the archeological, cultural, and historic resources are not provided in this section. For the preservation of the sites, specific information on the locations and nature of findings at the resources cannot be included in CEQA documents. Site–specific content and location information will be reviewed by appropriate federal and state agency officials on a need–to–know basis, thereby protecting the confidential information regarding location and content of the sites. Rugraw's HPMP is therefore unavailable for public review.

4.8.3 Analysis Methodology

4.8.3.1 Analytical Approach

According to section 15064.5, subdivision (b) of the CEQA Guidelines, a project with an effect that may cause a substantial adverse change in the significance of a historical resource is a project that may have a significant impact on the environment. The CEQA Guidelines further state that a substantial adverse change in the significance of a resource means the "physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of a historical resource would be materially impaired." (CEQA Guidelines, section 15064.5, subd. (b)(1)).

Actions that would materially impair the significance of a historic resource are those that would demolish or adversely alter those physical characteristics that convey its historical significance

and qualify it for inclusion in the CRHR or in a local register or survey that meet the requirements of sections 5020.1(k) and 5024.1(g) of the PRC.

The focus of the assessment is on physical changes to the environment that may affect cultural resources. The following methods were used to evaluate the potential impacts to cultural resources in the PAL:

- Analyze the results of previous studies to identify potential effects; and
- Set a level of significance of the individual cultural resources within the Proposed Project to use as the basis for the effects analysis.

4.8.3.2 Criteria for Determining Significance

The Regulatory Context section addresses the method for assessing significance of the cultural resource itself. The following is criteria for addressing the environmental effects to that resource.

Based on Appendix G of the 2020 CEQA Guidelines, the Proposed Project would have an impact if it would:

- Cause a substantial adverse change in the significance of a historical resource as defined in CEQA Guidelines section 15064.5;
- Cause a substantial adverse change in the significance of an archaeological resource pursuant to CEQA Guidelines section 15064.5; or
- Disturb any human remains, including those interred outside of formal cemeteries.

4.8.3.3 Archaeological and Architectural Field Investigation and Newly Recorded and Updated Resources

To determine the presence or absence of cultural resources within the PAL, Ferrell et al. (2014, confidential filing) conducted a pedestrian survey of the entire approximately 250–acre PAL from August 12 through 23, 2013, and on January 6, 13, and 14, 2014. Architectural surveys to determine if buildings, structures, and objects (BSOs) over 45 years of age were present within the PAL were conducted on August 22 and 23, 2013. The pedestrian inspection resulted in the identification of six previously undocumented isolates (four historic and two prehistoric), and five previously undocumented archaeological sites. Note: the isolates are not considered significant cultural resources. Additionally, six of the previously recorded archaeological sites were revisited and updated. The architectural survey resulted in the identification of seven new architectural resources (one structure complex and six roads) plus one previously recorded architectural resource (one road). The appropriate Department of Parks and Recreation (DPR) 523 forms were completed as appropriate for all updated and newly recorded resources. The results of the archaeological and architectural surveys as well as the forms are provided in the Cultural Resources Inventory Report (Ferrell et al., 2014).

Table 4.8–1 provides a summary of the newly recorded and updated previously recorded archaeological sites identified within the PAL and the eligibility of each resource for listing to the NRHP and CRHR.

Table 4.8–1. Archaeological Resources Identified within the PAL

Trinomial / Primary Site Number	Site Type	Resource Description	NRHP/CHRH Eligibility[a]
Updated–previously recorded sites			
CA–TEH–595	P	Originally recorded as a prehistoric village site "destroyed by road construction." The 1983 update confirms site was destroyed and only observed 3 flakes on surface. The site was visited in 2012 and no cultural material was observed.	Unknown
CA–TEH–1358/H	P/H	Multicomponent: Prehistoric Occupation Site: Lithic and ground stone scatter, tools, midden, and potential burials. Historic component: refuse scatter of cans/glass. Two earthen water conveyance ditches.	UN/AE
CA–TEH–1490	P	Lithic Scatter: obsidian and basalt flakes and tools, a corner notch point, and groundstone.	UN/AE
CA–TEH–1824H (previously CA–TEH–1835H)	H	Segment of the Last Chance Ditch, circa 1901: water conveyance ditch.	UN/AE
CA–TEH–2041H	H	Small historic sawmill remnants, associated features and refuse.	NE
CA–TEH–2113H	H	Refuse Scatter: cans and glass.	NE
Newly Identified Sites			
CA–TEH– 2495	P	Lithic and tool scatter obsidian and basalt flakes	UN/AE
CA–TEH–2496H	H	Refuse scatter: cans, nails, stove fragments, white improved earthenware, glass	NE
CA–TEH–2497	P	Lithic scatter: obsidian and basalt flakes, shell	UN/AE
CA–TEH–2498H	H	Refuse scatter: cans	NE
CA–TEH–2520H (temporary number 2LLHEP–JF–01*)	H	Refuse scatter: cans, white improved earthenware	NE

a. NRHP/CRHR concurrence SHPO letter dated April 1, 2014

* Site CA–TEH–2520H (temporary number 2LLHEP–JF–01) is incorrectly listed as 2LLHEP–JF–02H in the HPMP Vol I. dated February 2015.

Notes: AE = assumed eligible
E = Eligible
H = Historic
NE = Not Eligible
P = Prehistoric
UN = Undetermined NRHP Eligibility

Table 4.8–2. Archaeological Resources Identified within the APE

Trinomial / Primary Site Number	Site Type	Resource Description	NRHP/CHRH Eligibility[a]
Updated–Previously Recorded BSO			
P–52–002474	H	Road: Ponderosa Way	E
Newly Identified BSO			
CA–TEH–2499H	H	Road: Former Segment of State Route 36 (SPI Road 120 A 7)	E
CA–TEH–2500H	H	Structures: Lassen Lodge	NE
CA–TEH–2501H	H	Road: South Powerhouse Road	NE
CA–TEH–2502H	H	Road: Manton School Road	NE
CA–TEH–2503H	H	Road: Hazen Road	NE
CA–TEH–2504H	H	Road: Unnamed Dirt Road	NE
CA–TEH–2505H	H	Road: Unnamed Dirt Road	NE

a. NRHP/CRHR SHPO concurrence, letter dated April 1, 2014

Notes: E = Eligible
NE = Not Eligible

4.8.3.4 Native American Heritage Commission and Tribal Consultation

Rugraw has consulted with various tribes, including the Redding Rancheria, Wintu Tribe, Maidu Nation, Enterprise Rancheria of Maidu Indians, Greenville Rancheria of Maidu Indians, and Maidu–Pit River–Astugewi, and stakeholders. Culturally sensitive areas have been identified within and near the PAL; however, no Traditional Cultural Resources have been identified. Refer to *Section 4.18, Tribal Cultural Resources* for the discussion of TCPs.

Historic Properties Management Plan

As a result of comments received from SHPO, Rugraw filed a Revised HPMP in November 2015 to address current and future Proposed Project–related effects on eligible or potentially eligible cultural resources within Proposed Project's APE. The purpose of the HPMP is to provide specific requirements that would avoid, reduce, or mitigate cultural resources impacts. As stated in FERC's Final EIS (Section 5.1.2, Additional Measures Recommended by Staff, page 214), the Proposed Project includes finalizing the HPMP to include both California SHPO and FERC staff comments and recommendations. These revisions are described below under *Rugraw's Proposed Measures*.

The HPMP includes the following topics that would guide Rugraw in applying both general and site–specific treatment measures:

- Confidentiality
- General and site–specific treatment measures designed to address effects to historic properties that may be a result of the Project's construction, operation, and maintenance

- A process of consultation with appropriate state and federal agencies, participating tribes, and stakeholders
- A plan for public interpretation and education
- Procedures that will be implemented in the case of inadvertent discoveries
- Procedure that will be implemented in the case of emergency situations
- Procedures for the treatment of human remains
- A process for HPMP review and revision (as necessary)

The HPMP acknowledges that future changes to specific site treatments may be required and that consultation at such times with FERC, California SHPO, Native American tribes, and others, as appropriate, would be necessary.

Programmatic Agreement

On July 10, 2019, FERC and SHPO approved the Final Programmatic Agreement (PA) for the Proposed Project. The PA identifies specific stipulations that must be implemented by Rugraw as a condition of issuing a new license for the Proposed Project (FERC, 2019). Most importantly, these include:

- Revise the current HPMP in consultation with California SHPO, Native American tribes, and others, as appropriate, within one year of license issuance;
- Procedures to amend the PA; and
- Coordination with other federal agency reviews.

4.8.4 Applicant's Proposed Measures

As noted above, an HPMP was developed during the FERC licensing process and is required to be implemented. As stated in FERC's Final EIS (Section 5.1.2, Additional Measures Recommended by Staff, page 214), the Proposed Project includes finalizing the HPMP, to include both California SHPO and FERC staff comments and recommendations. Revisions to the HPMP will include: (1) modifying specific sections, and appendix B of the document for a clearer and more concise management approach for historic properties that may be affected by the Proposed Project; (2) copies of any post–2014 tribal correspondence and consultation related to the identification of cultural resources and development of the HPMP to document full compliance with section 106 of the NHPA; (3) a cultural resources interpretive element, such as installation of public interpretive signs at key viewing areas; (4) a detailed monitoring plan for cultural resources within the APE that are eligible for listing in the National Register or have not yet been evaluated; (5) provisions for periodic review and revision of the HPMP; (6) editorial corrections as specified in the EIS; and (7) inclusion of Volume II into the Final HPMP.

The HPMP requires the periodic assessment of information regarding management effectiveness. The HPMP requires Rugraw or its designee to prepare an annual report summarizing all cultural resource related activities conducted during construction and/or operation and maintenance of the Proposed Project for each year. Rugraw will submit the report

to the SHPO, participating tribal representative(s)[35] (i.e., members of the tribes who have requested consultation and wish to receive these reports), and FERC by December 31 of every year, for the duration of the license. If impacts to cultural resources are identified, the annual report will disclose those impacts, assess whether those impacts are a result of construction or operation and maintenance related to the Proposed Project, whether or not the impacts may have an effect on historic properties in consultation with the appropriate parties, and recommend further action, if necessary.

Key aspects of the HPMP are provided below:

- *Avoidance*. The Proposed Project will be designed to avoid all assumed eligible and eligible historic properties/resources identified within the PAL, as feasible. The Proposed Project proponent will ensure avoidance of assumed eligible and eligible historic resources through worker environmental training, fencing, monitoring, and other measures. Protocols for avoidance of impacts to historic properties are outlined in the HPMP and include avoidance, capping, and monitoring.
- *Resource Evaluations*. If any potentially eligible cultural resource or resource within the PAL cannot be avoided, it will be evaluated for NRHP and/or CRHR eligibility. If necessary to avoid adverse effects or significant impacts on the resource, additional treatments will be recommended for those resources recommended as or determined eligible. Treatments would include, but are not limited to, capping, data–recovery, or other items as determined though consultation with SHPO, FERC, Native American tribes, and/or others as appropriate.
- *Worker Education/Training*. As outlined in the HPMP, prior to construction of the Proposed Project, all personnel will be briefed by an archaeologist meeting the Secretary of the Interior's Professional Qualification Standards for Archaeology about the prehistoric and historic archaeological resources within the PAL. In addition, the training will include a discussion on the importance of, and the legal basis for, the protection of archaeological resources. Personnel will be given a training brochure regarding identification of cultural resources and protocols for reporting finds. If applicable, all archaeological and any Native American monitors will be introduced to Proposed Project personnel and their roles explained.
- *Archaeological Monitoring*. As outlined in the HPMP, a Cultural Resource Monitoring Plan (CRMP) that outlines protocols and procedures will be developed prior to construction of the Proposed Project. In general, monitoring will take place in areas containing sensitive resources and along the penstock PAL adjacent to South Battle Creek, near sites CA–TEH–595 and CA–TEH–2497. In addition, archaeological site CA–TEH–1358, CA–TEH–1824H, CA–TEH–1490, CA–TEH–2495 (near or within access roads) will be monitored by checking at random intervals. As a result of tribal consultation, Beverly Ogle, tribal elder with the Maidu–Pit River–Astugewi Tribe, has requested an Archaeological and Native American Monitor be present during project construction in sensitive areas. One monitor per earth–moving vehicle will be present. If

[35] Currently participating tribes include the Maidu–Pit River–Atsugewi, Maidu Nation, Redding Rancheria, Greenville Rancheria, Enterprise Rancheria of Maidu Indians, and Wintu Tribe of Northern California.

any cultural resources are identified by the monitor(s) during ground disturbing activities, the resource will be treated as an unanticipated discovery and the protocols outlined in the CRMP will be followed.

- *Inadvertent Discoveries of Archaeological Resources*. An Inadvertent Discoveries Plan (IDP) has been prepared for the Proposed Project and is included as Appendix B of the HPMP. The IDP outlines procedures in the event of an inadvertent discovery. If the construction staff or others observe previously unidentified archaeological resources during construction, they will halt work within a 200–foot radius of the find(s), delineate the area of the find with flagging tape or rope (may also include dirt spoils from the find area), and immediately notify the Proposed Project Archaeologist. Construction will halt within the flagged or roped–off area. The Proposed Project Archaeologist will assess the resource as soon as possible and determine appropriate next steps in coordination with Rugraw and the SHPO (and Native American representatives, as necessary). Such finds will be formally recorded and evaluated. The resource will be protected from further disturbance or looting pending evaluation as defined in the HPMP.

  Unanticipated and Inadvertent Discoveries of Human Remains. The IDP (HPMP, Appendix B) outlines the procedures for inadvertent discovery of human remains. If human remains and/or cultural items defined by Health and Safety Code section 7050.5, are inadvertently discovered during construction activities, all work in the vicinity of the find will cease and the Tehama County Coroner will be contacted immediately. If the remains are found to be Native American as defined by Health and Safety Code section 7050.5, the coroner will contact the NAHC by telephone within 24 hours. The NAHC shall immediately notify the person it believes to be the Most Likely Descendant (MLD) as stipulated by California PRC section 5097.98. The MLD(s), with the permission of the landowner and/or authorized representative, shall inspect the site of the discovered remains and recommend treatment regarding the remains and any associated grave goods. The MLD shall complete their inspection and make their recommendations within 48 hours of notification by the NAHC. The CRMP that will be developed for the construction of the Proposed Project will outline the protocol and procedures for unanticipated and inadvertent discoveries of human remains.

4.8.5 Environmental Impacts and Mitigation

4.8.5.1 Impacts Related to Historical Resources

IMPACT 4.8–1: Would the action cause a substantial adverse change in the significance of a historical resource as defined in CEQA Guidelines section 15064.5?

Proposed Project–related effects on cultural resources within the PAL are likely to occur from construction, operation, and maintenance, use and maintenance of project roads, vandalism, and mitigation measures associated with other project environmental resources. Proposed Project effects are considered to be adverse when an activity may alter, directly or indirectly, the characteristics of a historic property that qualify the property for inclusion in the National Register. If adverse effects are found, consultation with the California SHPO and other parties would be required to develop alternatives or modifications to avoid, minimize, or mitigate such adverse effects. The Proposed Project effects on eligible or unevaluated resources that may

occur as a result of construction, maintenance, and operation have been identified (Rugraw, 2015).

Construction, Operation, and Maintenance

Construction activities associated with the Proposed Project may result in direct impacts on archaeological sites and historic structures in the Proposed Project PAL. Over the license term, other activities such as road maintenance and use could also affect these resources.

The SHPO determined that there are six historic–era archaeological sites and six architectural resources within the PAL that are ineligible for listing in the National Register. These resources were also determined to be ineligible for listing in the California Register. Therefore, no further assessment of effects or continued management of these resources is required. There were five prehistoric archaeological sites documented in the PAL that were not determined ineligible by SHPO. One site (CA–TEH–595) has been destroyed by prior activities and there would be no effects to the site from Proposed Project–related activity (Tetra Tech, 2014), and the SHPO concurred in a letter dated April 1, 2014. The other four prehistoric sites had not been evaluated for listing in the NRHP or CRHR, but were assumed to be eligible (CA–TEH–1358/H, CA–TEH–1490, CA–TEH–2495, and CA–TEH–2497).

Ponderosa Way and two other unpaved county roads bisect site CA–TEH–1358/H; therefore, it has been affected by existing road construction and maintenance. In addition, activities including historic ditch construction, fire, heavy machinery use, logging, cattle grazing, recreation use, and deposition of modern refuse also contributed to affecting resources in the PAL. Another site, CA–TEH–1490 has also been bisected by an unpaved road and was thus affected by road construction, fire, fire suppression activities, and prior test excavations (Hamusek, 1988, as cited by Tetra Tech, 2015c). The SHPO determined that these two sites would be adversely affected through the Proposed Project's use of the existing roads traversing these sites for construction, operation, and maintenance purposes in a letter dated April 1, 2014.

The site, CA–TEH–2495 is located within the alignment of the proposed transmission line. However, the site had been previously affected by cattle grazing, recreation use (nearby gun club), fire, and erosion. Another site, CA–TEH–2497 had been bisected by a paved SPI road and was affected by logging activities, pedestrian traffic, past road construction, and maintenance. The SHPO determined that Proposed Project–related impacts can be avoided at these sites in a letter dated April 1, 2014. To avoid impacts, SHPO recommended stringing the transmission line over the sites. Consistent with SHPO's recommendation, Rugraw's Proposed Project includes towers and poles that are not located in sensitive areas and the powerlines will be stringed over the sites to avoid impacts.

There are two architectural resources (P–25–002474 [Ponderosa Way], CA–TEH–2499H [segment of SR 36]) that were determined to be eligible for listing in the NRHP and CRHR. It was determined that Proposed Project construction and/or operation and maintenance activities would not include alteration, demolition, or destruction of these roadways and that these roads would continue to be used as they were intended. The SHPO concurred in its April 1, 2014 letter that the Proposed Project would not affect the historic integrity of these resources. The SHPO also concurred that the proposed transmission line would not visually impact the Lassen Lodge (CA–TEH–2500H) thereby resulting in no potential effects on this structure.

Over a concern of potential Proposed Project–related effects on all prehistoric archaeological sites identified within the PAL, a representative of Redding Rancheria recommended that all sites be monitored during construction activities. The representative also stated that the remnants of the historic saw mill (CA–TEH–2041H) and the last remaining segment of Last Chance Ditch (CA–TEH–1824H) should be preserved. The SHPO determined that no treatment measures were necessary and concurred that these two resources are not eligible for listing in the NRHP in its April 1, 2014, letter.

In summary, there are six cultural resources that either have been determined eligible or are assumed eligible within the PAL. Of these resources, the Proposed Project can avoid impacts to two resources; the Proposed Project would have no impacts to two resources; and the Proposed Project would have adverse impacts to two resources (CA–TEH–1358/H and CA–TEH–1490). The HPMP details the procedures to reduce the impacts to these resources.

The HPMP was prepared in accordance with the Advisory Council and FERC's Guidelines for the Development of the HPMPs for FERC Hydroelectric Proposed Projects (2002) to address current and future Proposed Project–related effects on eligible or potentially eligible cultural resources within the PAL as part of the Final License Application. The HPMP proposes several general management measures for historic properties including but not limited to:

1. Appointment of a Cultural Resources Coordinator to oversee implementation of the HPMP over the license term;
2. Implement an employee education program;
3. Implement a plan for monitoring eligible or potentially eligible resources during construction and throughout the license term;
4. Implement a plan for maintenance of project roads, including historic roads;
5. Implement a plan to protect historic properties during road maintenance and rehabilitation;
6. Implement a plan for additional cultural resources inventories, site evaluations, and data recovery excavations (as needed);
7. Implement a plan for inadvertent discovery plan;
8. Identify procedures for the treatment of human remains that may be identified during project–related activities; and
9. Identify requirements for annual cultural resources reporting to FERC, California SHPO, and participating Native American tribes. Additionally, the HPMP contains a list of activities that would be exempt from NHPA section 106 consideration.

Another purpose of the HPMP is to discuss the specific Proposed Project effects on all resources and provide measures to avoid, lessen, or mitigate adverse effects on those that are eligible or potentially eligible for listing in the NRHP/CRHR. To reduce the impacts of the Proposed Project use of roads that bisect the sites CA–TEH–1358/H and CA–TEH–1490 during construction, a "capping" plan will be developed in consultation with the SHPO, FERC, Native American tribes, and others as appropriate. The goal of the capping plan will be to cover the resources with enough material that maneuvering construction equipment over the resource will not impact the resource. The appropriate depth is not known at this time and will be determined

during the consultation with the SHPO, FERC, Native American tribes, and others as appropriate.

High visibility fencing will be erected around sites CA–TEH–2495 and CA–TEH–2496, to avoid impacts and will be monitored during construction. If effects on any of these sites as a result of construction or future Proposed Project operation and maintenance activities cannot be avoided, then those sites shall be formally evaluated for its eligibility for inclusion on the NRHP/CRHR. If a site is determined to be eligible, then appropriate mitigation would be determined in consultation with the SHPO, FERC, Native American tribes, and others, as appropriate. As stated in the HPMP, the proposed methodology of the road capping would consider weight–bearing options that would not crush or impact the cultural material. Heavy compaction methods would not be used for road capping nor would heavy vehicles (over 29,000 pounds) travel along SPI roads R2, R5, and Ponderosa Way. This capping would be maintained during the entire construction period.

On May 8, 2018, FERC staff issued a draft PA with the associated HPMP for comment and review and received additional comments (filed on June 6, 2018), from the California SHPO. On July 10, 2019, FERC and SHPO approved the Final PA for the Proposed Project (FERC, 2019 [PA]). As provided in the PA, Rugraw is required by FERC to finalize the HPMP to address concerns of these agencies.

Compliance with the HPMP as revised would ensure any potential impacts historical resource are less than significant.

Construction, Operation, and Maintenance Impacts

- **Level of Significance:** Less Than Significant Impact
- **Mitigation Measures:** None required

4.8.5.2 Impacts Related to Archaeological Resources

IMPACT 4.8–2: Would the action cause a substantial adverse change in the significance of an archaeological resource pursuant to CEQA Guidelines section 15064.5?

Construction, Operation, and Maintenance

As stated above, there are six cultural resources that either have been determined eligible or are assumed eligible within the PAL. Of these resources, the Proposed Project can avoid impacts to two resources; the Proposed Project would have no impacts to two resources; and the Proposed Project would have adverse impacts to two resources (CA–TEH–1358/H and CA–TEH–1490).

The HPMP was prepared to specifically address known historic resources and requires implementation of mitigation measures at previously identified sites including: (a) avoid ground–disturbance in areas where archeological resources have been identified; (b) require the presence of an archeological monitor for all project activities that occur within 50 feet of identified sites; and (c) require formal evaluation for NRHP–eligibility and mitigation of any site where avoidance is not possible. The Final PA has been signed to ensure compliance with the

HPMP. Compliance with the Final HPMP, as revised, would ensure potential impacts to historical resource are less than significant.

Construction, Operation, and Maintenance Impacts

- **Level of Significance:** Less Than Significant Impact
- **Mitigation Measures:** None required

4.8.5.3 Impacts Related to Human Remains

IMPACT 4.8–3: Would the action disturb any human remains, including those interred outside of dedicated cemeteries?

Construction, Operation, and Maintenance

While there are no known formal cemeteries within the PAL and there are no known human remains within the PAL, there are possible burials documented at CA–TEH–1358/H. Disturbing these remains would be considered a significant impact. Additionally, with any project, there is always the possibility that unmarked burials may be unearthed during construction.

As discussed previously, the IDP (HPMP, Appendix B) outlines the procedures for inadvertent discovery of human remains. If human remains and/or cultural items defined by Health and Safety Code section 7050.5 are inadvertently discovered during construction activities, all work in the vicinity of the find will cease and the Tehama County Coroner will be contacted immediately. If the remains are found to be Native American as defined by Health and Safety Code section 7050.5, the coroner will contact the NAHC by telephone within 24 hours. The NAHC shall immediately notify the person it believes to be the Most Likely Descendant (MLD) as stipulated by PRC section 5097.98. The CRMP that will be developed for the construction of the Proposed Project will outline the protocol and procedures for unanticipated and inadvertent discoveries of human remains.

Implementation of the IDP would ensure that any potential impacts are less than significant.

Construction, Operation, and Maintenance Impacts

- **Level of Significance:** Less Than Significant Impact
- **Mitigation Measures:** None required

4.8.6 References

Baumhoff, M.A. 1955. *Excavations of Site THE–1 (Kingsley Cave)*. University of California Archaeological Survey Reports 30:40–73.

Baumhoff, M.A. 1957. *An Introduction to Yana Archaeology.* University of California Archaeological Survey Report 40. Berkley.

California Highways. 2012. State Highway Routes: Old and New [Internet] Link for Routes 33–40. Available online: www.cahighways.org (accessed April 2, 2020).

Farrell, Jenna, Compas, Lynn, and Julia Mates. 2014. Cultural Resources Inventory Lassen Lodge Hydroelectric Project FERC License Number 12496 Tehama County, California. Available online: www.battle–creek.net (accessed April 2, 2020).

General Land Office (GLO). 1875. Department of the Interior, General Land Office Map Township 29 North, Range 1 East Mount Diablo Meridian. Surveyors General Office, San Francisco, California.

Greenway, Greg B. 1982. Projectile Point Variability at Deadman's Cave (CA–TEH–290) in the Southern Cascade Mountains of Northeastern California. Unpublished Master's Thesis, Department of Anthropology, California State University, Sacramento.

Greenway, Greg B. 2004. Seasonality and Site Function at Deadman's Cave (CA–TEH–290). In: In Search of the Past: Papers in Honor of Jerry Johnson. Proceedings of the Society for Archaeology, Volume 17:123–132.

Hamusek, B. 1988. The Stratigraphy and Archaeology of CA–THE–1490: A Hunting Camp in Yana Territory, Northern, California. California Division of Forestry Reports Number 1. California Department of Forestry and Fire Protections, Sacramento, CA (not seen as cited in Tetra Tech, 2015b).

Hardwick, Susan W., and Donald G. Holtgrieve. 1996. *Valley for Dreams: Life and Landscape in the Sacramento Valley*. Rowman & Littlefield Publishers.

Heizer, R.F., and A. Elsasser. 1980. The Natural World of the California Indians. University of California Press (California Natural History Guides:46).

Hutchinson, W.H. 1956. Operations Map of the Sierra Flume Lumber Company and others who first put Sierra Pine on the world market 1870–1907. Carefully compiled from official surveys by W.H. Hutchinson.

Johnson, J.J. 1978. Yana. In: *Handbook of North American Indians,* Volume 8:361–369. Robert F. Heizer, ed. Smithsonian Institution, Washington, D.C.

Johnson, J.J. 2003. The Yahi and Southern Yana: An Example of Cultural Conservatism, Genetic Isolation, and an Impoverished Resource Base. *Proceedings of the Society for California Archaeology* 16:95–102.

Johnson, J.J., and D.J. Theodoratus. 1984. Cottonwood Creek Project, Shasta and Tehama Counties, California Dutch Gulch Lake, Intensive Cultural Resource Survey. Institute of Archaeology and Cultural Studies, Report Number 1, California State University, Sacramento.

Kraft, J., and B. Woodrum. 2005. Historical Overview of the Tehama–Shasta Bend District. Prepared for USDI Bureau of Land Management, Redding Field Office. Tehama County Resource Conservation District (Red Bluff).

Kroeber, A.L. 1925. Handbook of the Indians of California. Bureau of American Ethnology Bulletin 78. Washington.

Lewis, H.T. 1990. Reconstructing patterns of Indian burning in southwestern Oregon. In: *Living with the land: the Indians of southwest Oregon*, Hannon, R.K. Olmo (eds.), p.80–84. Southwestern Oregon Historical Society, Ashland, Oregon.

Lewis, H.T. 1993. Patterns of Indian burning in California ecology and ethnohistory. In: *Before the Wilderness: Environmental Management by Native Californians*, T.C. Blackburn and K. Anderson (eds.), p.55–116. Ballena Press, Menlo Park, California.

Lewis Publishing Company. 1891. A Memorial and Biographical History of Northern California, Illustrated. Containing a history of this important section of the Pacific coast from the earliest period of its occupancy… and biographical mention of many of its most eminent pioneers and also of prominent citizens of today.

Luning, W.F. 1903. *Official Map of the County of Tehama, California* carefully compiled from actual surveys by W.F. Luning, County Surveyor.

Luning, W.F. 1926. *Official Map of Tehama County California.* H.S. Crocker Co. Inc. San Francisco, California.

McCubbins, Tom. 2010. WUI and Watershed Protection/Emergency Access Assessment (Coleman Fish Hatchery Road and Ponderosa Way). Tehama County Resource Conservation District. P. 15. Available online: www.tehamacountyrcd.org (accessed April 2, 2020).

Oakley–McFarlin, Patti. 2008. Wheeler Edward "Wheel" Hazen. Listing in: *Find a Grave* [Internet]. Available online: www.findagrave.com (accessed April 2, 2020).

Office of Historic Preservation. 1995. Instructions for Recording Historical Resources. Available online: scic.org (accessed April 3, 2020).

Otis, A.T., W.D. Honey, T.C. Hogg, and K.K. Lakin. 1986. *The Forest Service and the Civilian Conservation Corps: 1933–42.* Chapter 7: Region 5, The California Region. United States Department of Agriculture, Forest Service. August. Available online: www.nps.gov (accessed April 2, 2020).

Sapir, E. and L. Spier. 1943. Notes on the Culture of the Yana. *University of California Anthropological Records* 3(3):239–298.

Schultz, P.E. 1954. Indians of Lassen Volcanic National Park and Vicinity. Loomis Museum Associates, Red Bluff, California. United States.

Serr, Gene. [no date.] More Water for the Champion: Jack Turner and the Last Chance Ditch. Unpublished Manuscript.

State of California (State of California, Department of Public Works, Division of Highways). 1934. Tehama County: Highway Transportation Survey of 1934. Rand McNally. Website: www.davidrumsey.com (accessed April 2, 2020).

Sundahl, Elaine. 2001. Archaeological Investigations at CA–TEH–1783. The Jelly Mound Site. On file at the Northeastern Information Center, Chico, California and at the Bureau of Land Management, Redding, California.

Tehama County. 2011. Tehama County, 1856–2006: 150 years of Photos and History. Revised edition. Published by Tehama County Genealogical and Historical Society, Red Bluff, California.

Tehama County. 2013. California Genealogy & History Archives. Available online at: www.rootsweb.ancestry.com (accessed April 2, 2020).

Tetra Tech. 2015. Final License Application Appendix J, Historic Properties Management Plan Lassen Lodge Hydroelectric Project FERC License Number 12396 South Fork Battle Creek Tehama County, California, Volumes I and II. November 20.

Thornton, M.V. 1995. General History, Part 2. CAL FIRE. Available online: www.fire.ca.gov (accessed April 2, 2020).

Treganza, A. 1962. Department of Parks and Recreation Form CA–THE–595. On file at the Northeast Information Center, California State University, Chico, California.

U.S. Geological Survey (USGS). 1956. Manton 15–Minute Quadrangle.

Watts, Diane C., and Michael A. Dugas. 1998. A Chronological Look at the Changing Pattern of Human Use in the Watersheds of Mill, Deer, and Antelope Creek. Appendix Q. In: *Watershed Analysis for Mill, Deer, and Antelope Creeks*. Prepared by the Almanor Ranger District, Lassen National Forest, Susanville, California.

West, J.G., W. Woolfenden, J. Wanket, and S. Anderson. 2007. Late Pleistocene and Holocene Environments. In California Prehistory: Colonization, Culture, and Complexity. Terry L. Jones and Kathryn A. Klar, editors, pp. 11–34. Altamira Press, Lanham, Maryland.

Wiant, Wayne C. 1981. Southern Yana Subsistence and Settlement: An Ecological Model. Master's Thesis Department of Anthropology, California State University, Sacramento.

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4.9 Energy

This chapter describes the regulatory framework and existing conditions related to energy and evaluates the potential impacts that could occur as a result of implementation of the Proposed Project related to energy.

4.9.1 Environmental Setting

California has the world's fifth–largest economy and many energy–intensive industries. However, the state has one of the lowest per capita energy consumption levels in the United States. California's efforts to increase energy efficiency and implement alternative technologies have slowed growth in energy demand. California also leads the nation in non–hydroelectric renewable–sourced electricity generation and is among the top producers of conventional hydroelectric power (EIA, 2018).

Overall, the transportation sector accounts for two–fifths of state end–use energy consumption. The industrial sector, which accounts for almost one–fourth of state energy use, is the second–largest energy consumer in California. The commercial and residential end–use sectors consume roughly equal amounts of the state's energy at slightly less than one–fifth each. However, per capita energy use in California's residential sector is lower than that of any other state except Hawaii. In most of California's more densely populated areas, the climate is dry and relatively mild, and more than two–fifths of state households do not use air conditioning, and about one–seventh do not use space heating, both of which require large amounts of energy to use (EIA, 2018).

Tehama County electrical supply is provided by Pacific Gas & Electric Company (PG&E). The Proposed Project would interconnect with an existing PG&E substation and provide 5 MWs of renewable energy annually (24,936 MWhs) into the PG&E distribution system. According to the California Energy Commission (CEC), in 2018 the total of non–residential and residential electricity consumption in Tehama County was approximately 508.4 gigawatt hours (GWh). PG&E also provides natural gas to Tehama County. The 2018 gas consumption analysis indicates the total of non–residential and residential gas consumption was approximately 10.5 million therms (CEC, 2018).

4.9.2 Regulatory Setting

4.9.2.1 Federal

Energy Independence and Security Act of 2007

Signed into law in December 2007, the Energy Independence and Security Act contains provisions designed to increase energy efficiency and the availability of renewable energy. The Act contains provisions for increasing fuel economy standards for cars and light trucks, while establishing new minimum efficiency standards for lighting as well as residential and commercial appliance equipment.

Energy Policy Act of 2005

Passed by Congress in July 2005, the Energy Policy Act contains a comprehensive set of provisions to address energy issues, including tax incentives for energy conservation improvements in commercial and residential buildings, fossil fuel production and clean coal

facilities, and construction and operation of nuclear power plants. Subsidies are also included for geothermal, wind energy, and other alternative energy producers.

National Energy Policy

Established in 2001 by the National Energy Policy Development Group, the National Energy Policy is designed to help the private sector and state and local governments promote dependable, affordable, and environmentally sound production and distribution of energy for the future. Key issues addressed by the energy policy are energy conservation, repair and expansion of energy infrastructure, and ways of increasing energy supplies while protecting the environment.

Corporate Average Fuel Economy Standards

The Corporate Average Fuel Economy (CAFE) standards, developed by the National Highway Traffic Safety Administration (NHTSA), regulate how far vehicles must travel on a gallon of fuel. The NHTSA sets CAFE standards for passenger cars and light–duty trucks, and separately sets fuel consumption standards for medium– and heavy–duty trucks and engines. NHTSA also regulates the fuel–economy window stickers on new vehicles. These standards help ensure that vehicles are as fuel efficient as technologically feasible. These standards are fleet–wide averages that must be achieved by the manufacturers.

4.9.2.2 State

Renewables Portfolio Standard

California's Renewables Portfolio Standard (RPS) applies to the Proposed Project's energy generation and use. The RPS is a result of Senate Bill (SB) 1078, which was signed in 2002 and mandated that utilities – investor, municipal and publicly owned – deliver 20 percent of their electricity from eligible renewable energy sources by 2017. SB 107, passed in 2006, changed this mandate to 20 percent by 2010. SB X1–2, passed in 2011, extended the RPS procurement requirements to 33 percent by 2020. SB 350, passed in 2015, further extended the RPS procurement requirements to 50 percent by 2030. In 2018, SB 100 was signed into law, raising the RPS requirements to 60 percent by 2030 and 100 percent by 2045. Renewable energy sources that count toward RPS procurement requirements include solar, wind, biomass, geothermal, and small hydroelectric facilities (facilities that generate 30 MW or less).

California Energy Code

The State of California provides a minimum standard for energy conservation through California Code of Regulations, title 24, part 6, commonly referred to as the California Energy Code. Part 6 establishes energy efficiency standards for residential and non–residential buildings constructed in California to reduce energy demand and consumption. The California Energy Code was first adopted by the California Energy Resources Conservation and Development Commission in June 1977. The standards are updated on a three–year cycle to allow for consideration and possible incorporation of new energy efficiency technologies and methods. The 2019 Building and Energy Efficiency Standards, which were adopted on May 9, 2018, went into effect starting January 1, 2020. Applicants who file building permit applications on or after January 1, 2020, must comply with the 2019 Building and Energy Efficiency Standards (CEC 2020).

State Greenhouse Gas Regulations

In 2002, the California legislature passed AB 1493, California's Greenhouse Gas Vehicle Emission Standards under Assembly Bill 1493 of 2002. AB 1493 required the California Air Resources Board (CARB) to "adopt regulations that achieve the maximum feasible and cost–effective reduction of greenhouse gas emissions from passenger vehicles, beginning with the 2009 model year" (CARB 2020). CARB adopted these regulations in August 2005.

Governor Schwarzenegger signed GHG Reduction Executive Order S–3–05 on June 1, 2005, setting GHG reduction targets for the state. Soon after, the California legislature passed AB 32, the Global Warming Solutions Act (2006) on August 31, 2006, to place the State of California on a course toward reducing its contribution of GHG emissions. In response to AB 32, CARB developed a Scoping Plan to be updated every five years, outlining California's approach to reducing GHG emissions.

The latest Update to the Climate Change Scoping Plan sets a 2030 target of 40 percent GHG emissions reductions below 1990 levels. CARB approved the Update to the Climate Change Scoping Plan on December 14, 2017, as required by AB 32.

4.9.2.3 Local

Tehama County General Plan

The Open Space and Conservation Element of the Tehama County General Plan provides several energy and green building mitigation measure recommendations, as follows:

- Offer energy efficiency information, technical assistance, training, and incentives.
- Use renewable energy in county facilities.
- Facilitate renewable energy technologies and design.
- Provide incentives for alternative energy production.
- Divert construction waste.

4.9.3 Analysis Methodology

4.9.3.1 Analytical Approach

The CEQA thresholds of significance related to energy focus on avoiding and reducing inefficient, wasteful, and unnecessary energy consumption. The area of assessment includes PG&E's service area in Tehama County, with consideration of state energy goals. As the Proposed Project's purpose is to generate hydroelectric power, this impact analysis focuses on the energy requirements associated with construction and the Proposed Project's impact to California's RPS requirements.

4.9.3.2 Criteria for Determining Significance

Per the 2020 CEQA Guidelines Appendix G, the Proposed Project would result in a potentially significant energy impact if it would:

- Result in wasteful, inefficient, or unnecessary consumption of energy resources during project construction or operation.

- Conflict with or obstruct a state or local plan for renewable energy or energy efficiency.

4.9.4 Environmental Impacts and Mitigation

The Proposed Project does not include any environmental measures that specifically address energy impacts.

4.9.4.1 Impacts Related to Energy Consumption

IMPACT 4.9–1: Would the project result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources during project construction or operation?

Construction

Construction activities would involve temporary consumption of energy resources for the operation of construction equipment and vehicle travel. Appendix B describes the types of equipment and anticipated hours of operation. The types of equipment include excavators, tractors, and loaders, trucks, and worker vehicle trips. The total estimated energy consumption for construction activities is 20,945 gallons of diesel fuel and a total of approximately 5,808 gallons of gasoline. This would result in approximately 3.6 billion British thermal units (Btu) of energy use. These fuels would be consumed over one year and would represent a small amount of the energy used in the state. In 2018, the total energy consumption in California was 7,967 trillion Btu (USEIA, 2020). The estimated energy use for the entire construction period represents approximately 0.0000008 percent of the energy used in California in 2018.

Fuel energy consumed during construction would be temporary and would not represent a significant demand on energy resources. Some incidental energy conservation would occur during construction by complying with state idling requirements, which require construction equipment to be turned off when not in use for more than five minutes. Project construction equipment would also be required to comply with the latest United States Environmental Protection Agency and CARB engine emissions standards. These emissions standards require highly efficient combustion systems that maximize fuel efficiency and reduce unnecessary fuel consumption.

Due to increasing transportation costs and fuel prices, contractors have a strong financial incentive to avoid wasteful, inefficient, and unnecessary consumption of energy during construction. There are no unusual Proposed Project characteristics that would require the use of construction equipment or practices that would be less energy efficient than at comparable construction sites in the region or state. Therefore, construction energy consumption associated with the Proposed Project is not expected to be inefficient, wasteful, or unnecessary. Impacts would be less than significant.

Operation and Maintenance

The Proposed Project is anticipated to operate under a FERC license for 50 years. Operation of the Proposed Project would involve up to four weekly vehicle trips, with minimal energy needed for operation of Proposed Project facilities (e.g., lighting and equipment). Maintenance activities would require up to 24 vehicle trips annually, over a 2– to 4–week period. All vehicles used for

travel would be complaint with EPA CAFE standards. The estimated energy consumption for annual operation and maintenance vehicle trips is 178 gallons of gasoline. This would result in approximately 21 million Btu of energy use. During the Proposed Project's lifetime of operation, the Project would generate 5 MWs (24,936 MWhs) of renewable energy with an annual energy output of approximately 85 billion Btu. The annual operation and maintenance energy requirements are a small fraction of the annual clean energy output from Proposed Project energy generation. Furthermore, the Proposed Project would contribute to the state's RPS, which requires the increased production of energy from renewable resources. Therefore, although the Proposed Project would require minimal amounts of energy, it would result in long term beneficial impact on energy. Less than significant impact would occur related to operation and maintenance.

Construction Impacts

- **Level of Significance:** Less Than Significant Impact
- **Mitigation Measures:** None required.

Operation and Maintenance Impacts

- **Level of Significance:** Less Than Significant Impact
- **Mitigation Measures:** None required

4.9.4.2 Impacts Related to Renewable Energy Plans

IMPACT 4.9–2: Would the project conflict with or obstruct a State or local plan for renewable energy or energy efficiency?

Construction

Tehama County does not have any renewable energy or energy efficiency plans pertaining to construction activities (i.e. on–road and off–road vehicle use). However, there are existing CARB engine emissions standards, which require highly efficient combustion systems that maximize fuel efficiency and reduce unnecessary fuel consumption for the purpose of reducing air pollutant emissions. The Proposed Project would be in compliance with these standards with incorporation of Mitigation Measure AIR–1 (see *Section 4.4, Air Quality*, Impact 4.4–2). Mitigation Measure AIR–1 specifically requires registration in CARB's DOORS program. This program is an on–line reporting tool that ensures off–road diesel equipment are in compliance with the emissions standards. Without implementation of Mitigation Measure AIR–1, the Proposed Project impacts could be potentially significant, however with the implementation of Mitigation Measure AIR–1, potential conflicts with energy efficiency mandates would be less than significant.

Operation and Maintenance

As a hydroelectric project generating renewable energy, operating the Proposed Project would meet the Tehama County General Plan goal of facilitating renewable energy technologies. The Proposed Project would interconnect with an existing PG&E substation and transmit 5 MWs of renewable energy annually into the PG&E distribution system. This additional renewable energy

supply would help PG&E meet the RPS mandate requiring 60 percent of its electricity portfolio to come from renewable sources by 2030.

As discussed in *Section 4.14, Land Use and Planning*, Rugraw is required to obtain Tehama County approvals (e.g., Building Permit) which would ensure that the Proposed Project meets CBC Standards, including energy efficiency requirements. Therefore, operation and maintenance impacts would be less than significant.

Construction Impacts

- **Level of Significance:** Less Than Significant with Mitigation Incorporated
- **Mitigation Measures:** ENERGY–1. Implement AIR–1, which requires "Registration in CARB's DOORS Program (www.arb.ca.gov) and meeting all applicable standards for replacement and/or retrofit.

Operation and Maintenance Impacts

- **Level of Significance:** Less Than Significant Impact
- **Mitigation Measures:** None required.

4.9.5 References

California Air Resources Board (CARB). 2020. California's Greenhouse Gas Vehicle Emission Standards under Assembly Bill 1493 of 2002 (Pavley). Found at: www.arb.ca.gov

California Energy Commission (CEC). 2018. Electricity Consumption by County, Tehama County. Found at: www.ecdms.energy.ca.gov

California Energy Commission (CEC). 2020. 2019 Building Energy Efficiency Standards. Found at: www.energy.ca.gov

National Highway Traffic Safety Administration (NHTSA). 2020. Corporate Average Fuel Economy. Found at: www.nhtsa.gov.

U.S. Energy Information Administration (EIA). 2020. California State Energy Profile. Found at: www.eia.gov

4.10 Geology and Soils

This section evaluates the Proposed Project's potential impacts related to the existing geological and soil conditions in the area, concentrating particularly on any potential hazards that could result from construction, operation, and maintenance activities.

4.10.1 Environmental Setting

4.10.1.1 Regional Setting

The Proposed Project area is located at the southern end of the Cascade Range, which includes a chain of volcanoes that extends from British Columbia into northern California. Near the Proposed Project area is the southwestern flank of the Lassen Peak volcanic system, approximately 12 miles from Lassen Peak and 1.5 miles west of the town of Mineral, an unincorporated community in Tehama County, California

Regional Geology

The California Division of Mines and Geology divides the state in twelve geomorphic provinces based on geologic differences, including rock type, structure, and mineral deposits (CGS, 2002). The Proposed Project is in the Cascade Range geomorphic province, which dates to the Miocene (23 to 5 million years ago) to Plio–Pleistocene age (5 million years ago to 12,000 years ago).

At the southern end of the Cascade Range the basement rocks are sedimentary deposits of late Cretaceous age (100 to 66 million years ago). These basement rocks are overlain by volcanic deposits of Late Pliocene (5.3 to 2.6 million years ago) and Quaternary age (2.6 million years ago to present). The predominant deposit in the Proposed Project area is Late Pliocene ashflow tuff breccia (rock consisting of angular fragments cemented together) of the Tuscan Formation.

The 1917 event included an explosive eruption sequence that produced a 19–mile mudflow down the northeastern slope. Lassen Peak is only one cluster of volcanic domes that had flows of andesite, dacite, and rhyolite during the Quaternary age. The flows were followed by lahars, or hot volcanic debris avalanches, that formed into tuff breccia.

Seismicity

As stated in the geotechnical investigation conducted for the Proposed Project (Twining, 2019), the Proposed Project is located between two zones of tectonic activity. To the west is a zone of right lateral shear[36] within the northern Coast Ranges that runs parallel to the San Andreas fault; this zone represents a wide mobile belt of continuing deformation along the boundary between the North American and the Pacific crustal plates. To the east is a zone of generally east–west crustal extension[37] corresponding to the Basin and Range province. The Proposed Project area contains no major faults (Clynne and Muffler, 2010). The most recent faulting in the region occurred in 1975 with minor movement along the Cleveland Hill Fault south of Oroville,

[36] Right lateral shear is defined as a type of fault where the right block of geological structure moves toward you and the left block moves away.

[37] East–west crustal extension is the deformation of the upper crust and breakage into slivers that are oriented to the direction of extension, in this case east–west.

approximately 50 miles south of the Proposed Project area, accompanied by an earthquake sequence.

The seismicity of the southern Cascade Range can be characterized by several earthquake epicenters that produce magnitude events that measure up to 4.5 on the Richter scale. Most of the earthquakes in this region originate through Basin and Range–style tectonic faulting, but some are associated with young volcanic centers. The Cascade Range seismicity involves generally shallow events, occurring at depths to about 7.5 miles. Earthquakes occurred in the vicinity of Mount Lassen during the eruptions of 1917. Two earthquakes of magnitude 5.0 and 5.5 on the Richter scale occurred in 1946 and one event in 1991.

Soils

Soil in the Proposed Project area consists of weathering products of Tertiary (66 to 2.6 million years ago) and Quaternary volcanic flows and mudflow deposits. These soils contain varying concentrations of stones and gravel. The soil profile tends to be the thickest over the tuff breccia of the Tuscan Formation, reaching several feet. More recent basaltic andesite deposits weathered into reddish colored soils. The Tuscan unit is the least strong, relatively speaking, of the rock units in the Proposed Project area (Twining, 2019).

Spalling and abundant rockfall slope instability are present on the steep canyon walls, especially the north wall. However, there is no evidence of deep–seated rotational or translational landsliding[38] in the Proposed Project area. Rockfalls appear to be controlled by the jointing in the flows and undercutting by weathering of rocks (Twining, 2019). Based on review of the California Geological Survey, Susceptibility to Deep–Seated Landslides (CGS, 2011), the Proposed Project area is located in Class V, which is considered to be at the low end of susceptibility. Classes VIII, IX, and X are areas considered to have high landslide susceptibility (DOC, 2011).

The soils at the diversion site consist of primarily alluvial river sediments with large boulders and gravels with very little fine materials such as clay or organic matter. Sediment accumulation in the streambed of the affected reach of South Fork Battle Creek is limited by high–velocity water flows.

4.10.2 Regulatory Setting

The following section discusses the relevant policies and regulations that are specific to the analysis of geology and soil impacts.

4.10.2.1 Federal

Federal Water Pollution Control Act and Clean Water Act

The Federal Water Pollution Control Act of 1972 and Clean Water Act of 1977 regulate the discharge of pollutants into waters of the United States, including the discharge of sediment to surface water as a result of erosion. The Soil Conservation Service National Engineering

[38] Deep–seated landslides are those in which the bulk of the slide plane lies below the roots of forest trees. This depth can range from ten feet to several hundreds of feet. If the slip surface is curved the slide is rotational. A landslide that moves roughly planar with little rotation or backward tilting is translational.

Handbook provides standards for planning, design, and construction of soil conservation practices to be implemented during construction projects. Also, the National Pollution Discharge Elimination System (NPDES) permit requires control of potential discharges of sediment and other pollutants.

4.10.2.2 State

Alquist–Priolo Fault Zoning Act

The Alquist–Priolo Earthquake Fault Zoning Act of 1972 (Alquist–Priolo Act) was drafted to avoid or reduce damage to structures from earthquakes. In compliance with the Alquist–Priolo Act, the California Geological Survey has established Earthquake Fault Zones along known active faults in California. It prohibits development within 50 feet of an active fault zone. Cities and counties affected by the zones must regulate development near active faults in order to mitigate the hazard of surface fault rupture. The nearest known active faults belong to the Battle Creek fault zone approximately 11 miles northwest of the Proposed Project area and the Butt Creek fault Zone 15 miles east of the Proposed Project area (Twining, 2019). The actual Proposed Project area is not within an Earthquake Fault Zone and no mapped active fault traces are known to traverse the site. Additionally, the area is not located in an Alquist–Priolo Earthquake Fault Zone (SMGB, 1972).

Seismic Hazards Mapping Act

The Seismic Hazards Mapping Act (SHMA), passed in 1990, addresses non–surface fault rupture earthquake hazards, including liquefaction and seismically induced landslides. Seismic hazard zones are mapped by the State Geologist to assist local governments in land use planning. The Proposed Project area is not located within a seismic hazard zone (CGS, 1990).

California Building Code and American Society of Civil Engineers

All new development in California must comply with the California Building Code (CBC) and meet the standards of the American Society of Civil Engineers (ASCE). The CBC is based on three criteria: standards adopted by states based on national model codes; national model codes adapted to meet California conditions; and standards passed by the state legislature that address concerns specific to California.

The *Minimum Design Loads and Associated Criteria for Buildings and Other Structures (ASCE 7–10)* is an integral part of building codes in the United States. The ASCE describes the means for determining structural load requirements based on different environmental conditions (e.g., earthquakes, snow, rain, etc.)

4.10.2.3 Local

Tehama County General Plan

The Seismic and Geologic Hazards Element of the Tehama County General Plan (Tehama, 2009) includes the following objectives and policies to reduce risks from seismic and other geologic hazards:

- *GOAL SAF–4:* To minimize the threat of personal injury and property damage due to seismic and geologic hazards

- *Policy SAF–4.1*: The County shall require that all construction comply with the California Building Code (CBC), including the requirements for seismic design.
- *Policy SAF–4.2*: The County shall require that all new development and redevelopment projects that have the potential for seismic or geological hazards, including liquefaction, landslides, and expansive soils, be subject to geotechnical evaluation prior to approval
- *Policy SAF–4.3*: The County shall maintain current information on seismic and geologic hazards.
- *Policy SAF–4.4:* The County shall incorporate seismic and geologic hazards mitigation measures into County ordinances and procedures.

4.10.3 Analysis Methodology

4.10.3.1 Analytical Approach

An evaluation of the Proposed Project's impacts related to geology and soils was performed based upon an assessment of the Proposed Project location, geology and soils setting, and Rugraw–proposed measures. The area of assessment of potential impacts is the area within the Proposed Project boundary, as shown in Figure 2–1.

4.10.3.2 Criteria for Determining Significance

Based on Appendix G of the 2020 CEQA Guidelines, a Proposed Project could have an impact on the environment related to geology, soils, or seismicity if the Proposed Project would:

- Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:
  - 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;
  - Strong seismic ground shaking;
  - Seismic–related ground failure, including liquefaction; or
  - Landslides.
- Result in substantial soil erosion or the loss of topsoil;
- 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 offsite landslide, lateral spreading, subsidence, liquefaction, or collapse;
- 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;
- Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater; or
- Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.

4.10.3.3 Applicant's Proposed Measures

Rugraw proposed general construction measures that would address Proposed Project impacts to geology and soils. Relevant measures are described below.

General Construction Measures

1. Develop a construction plan to be filed for FERC approval prior to the start of ground–disturbing activities. This construction plan should also be closely coordinated with the SWPPP.
2. Limit land disturbance and vegetation clearing to those areas needed for construction. Delineate the limits of construction, work areas, and multipurpose areas with flagging, fencing, and/or stakes to prevent land–disturbing activities outside of construction areas.
3. Stockpile natural topsoils and replace, regrade, and revegetate disturbed areas, in accordance with California forestry regulations and best practices, with native vegetation. Restore disturbed stream and riparian habitat to pre–construction conditions and with riparian plantings and/or seeding, where applicable, with seed mixes recommended by CDFW.
4. Develop a SWPPP with measures to prevent storm–induced erosion and sedimentation during ground–disturbing construction activities, including:

a. Store spoils from Project construction in areas that limit erosion of spoil material and prevent runoff into aquatic habitats.

b. Install cofferdams, silt fences, or other structures to isolate in–water work areas and only use washed riprap, rocks, and gravel adjacent to or in watercourses (see Impact 4.10–2 for additional SWPPP measures).

5. Use existing roads to the maximum possible extent, constructing new access roads only when necessary; limit access roads to a width of 12 feet whenever possible; and surface permanent roads with gravel to a depth and quantity sufficient to maintain a stable road surface and minimize erosion and dust.
6. Conduct in–water work activities between July 1 and October 15 when streamflows are low to protect water quality and aquatic resources.

4.10.4 Environmental Impacts and Mitigation

4.10.4.1 Impacts Related to Earthquakes, Seismic Effects, and Landslides

IMPACT 4.10–1: Would the project 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?

Construction, Operation, and Maintenance

An active fault is defined by the Alquist–Priolo Act as a fault which has geomorphic evidence of surface rupture that has occurred within the last 11,000 years (SMGB, 1972). No identified active faults are delineated within the Proposed Project area by the most recent Alquist–Priolo Act map and the California Earthquake Hazards Zone Application (CGS, 2019).

The Proposed Project is located between two zones of tectonic activity. To the west is a zone of right lateral shear within the northern Coast Ranges. To the east is a zone of generally east–west crustal extension corresponding to the Basin and Range province. Earthquakes due to the tectonic activity of the northern Coast Ranges and the Basin and Range province would not be expected to cause fault rupture within the Proposed Project area as their mapped traces are not located within the Proposed Project area.

Since active faults are not delineated within the Proposed Project area by the most recent Alquist–Priolo Act map, and the California Earthquake Hazards Zone Application, the Proposed Project is not expected to result in exposure of people or structures to adverse effects related to rupture of a known earthquake fault. No impact would occur.

Construction, Operation, and Maintenance Impacts

- **Level of Significance:** No Impact
- **Mitigation Measures:** None required

(ii) Strong seismic ground shaking?

Construction, Operation, and Maintenance

The regional seismicity is related to the Basin and Range–style tectonic faulting, but some seismic activity is associated with young volcanic centers. Despite being located in a seismically active region, the seismic activity felt is minimal.

As noted in the Tehama County General Plan, Tehama County has experienced only minor earthquakes and minor secondary impacts from earthquakes centered out of the area (Tehama, 2009). In addition, there have been no previous reports within the County that included strong seismic ground shaking.

Regardless, all engineering drawings must be reviewed and approved by FERC for consistency with federal engineering standards. In addition, general construction must meet applicable federal construction requirements, including ASCE standards, to ensure that buildings have sufficient structural load in the event of an earthquake. Moreover, Rugraw will comply with all state and County seismicity building standards to ensure that all facilities meet CBC and Tehama County General Plan standards. FERC review and approval of all engineering plans, and compliance with applicable other federal, state and local building standards would minimize the potential for collapse of facilities or loss of life related to strong seismic ground shaking in the Proposed Project. Therefore, the impact related to risk of loss, injury, or death due to strong seismic ground shaking would be less than significant.

Construction, Operation, and Maintenance Impacts

- **Level of Significance:** Less Than Significant Impact
- **Mitigation Measures:** None required

(iii) Seismic–related ground failure, including liquefaction?

Construction, Operation, and Maintenance

Tehama County is exposed to minimal seismic hazards due to its geographic location. There are no active or potentially active faults within Tehama County. Hazards associated with seismic activity, such as liquefaction, have a low probability of occurring at the Proposed Project area (Twining, 2019).

Review of the California Geological Survey Seismic Hazard Mapping confirms that hazards associated with seismic activity have low probability because the Proposed Project is not located within a Seismic Hazard Zone, a regulatory zone that encompasses areas prone to liquefaction and earthquake–induced landslides (CGS, 1990). The nearest known active faults belong to the Battle Creek fault zone approximately 11 miles northwest of the site and the Butt Creek fault Zone 15 miles east of the site. As a result, the likelihood of surface fault rupture at the site is low (Twining, 2019).

Liquefaction refers to the process by which water–saturated, unconsolidated sediments are transformed into a substance that acts like liquid. In the area of the diversion dam liquefaction potential is low. This is based on the mapped geologic units, which suggest that subsurface conditions likely consist of rock.

All engineering drawings must be reviewed and approved by FERC for consistency with federal engineering standards. In addition, general construction must meet applicable federal construction requirements, including ASCE standards, to ensure that buildings have sufficient structural load in the event of an earthquake. Moreover, Rugraw will comply with all state and County seismicity building standards to ensure that all facilities meet CBC and Tehama County General Plan standards. Therefore, the risk of loss of life and property damage due to seismic–related ground failure would be minimized.

Based upon the low probability of seismic–related ground failure of the Proposed Project area, FERC review and approval of all engineering plans, and compliance with applicable other

federal, state and local building standards would minimize impacts related to the potential for seismic–related ground failure, including liquefaction. The impact would be less than significant

Construction, Operation, and Maintenance Impacts

- **Level of Significance:** Less Than Significant Impact
- **Mitigation Measures:** None required

(iv) Landslides?

Construction, Operation, and Maintenance

A landslide is a cohesive mass of soil that comes into motion. Similarly, in a rockfall, blocks, stones, gravel, and sand move freely down a slope. Spalling, fragments of stone, and abundant rockfall slope instability are present on the steep canyon walls in the Proposed Project area. However, there is no evidence of deep–seated rotational or translational landsliding (Twining, 2019, CGS, 2011). As concluded in the geotechnical report, the potential for rockfall in the Proposed Project area appears to be naturally controlled by the stability of the area geology. The Proposed Project area is not located in a landslide susceptibility area or Seismic Hazard Zone, and therefore, not prone to earthquake–induced landslides (CGS, 1990). Therefore, the potential substantial adverse effects, including the risk of loss, injury, or death from landslides and rockfalls are not expected and no impact would occur.

Construction, Operation, and Maintenance Impacts

- **Level of Significance:** No Impact
- **Mitigation Measures:** None required

- ***Impacts Related to Erosion***

IMPACT 4.10–2: Result in substantial soil erosion or the loss of topsoil?

Construction

The Proposed Project has potential to cause localized erosion through actions such as excavation, trenching, vegetation clearing, and disturbing upland areas. Rugraw proposed to implement general construction measures as listed above to minimize potential environmental impacts. Rugraw also proposed to develop and implement a SWPPP to prevent erosion and sedimentation during Proposed Project construction. The SWPPP would include, at a minimum, provisions to:

- Limit surface disturbance to only those areas necessary for construction, thereby preserving existing vegetation;
- Salvage and stockpile topsoil and, following construction, replace, regrade and seed topsoil with native vegetation;

- Use temporary fencing and protective barriers to protect vegetation not required to be removed;
- Initiate construction immediately following vegetation clearing to minimize the exposure of disturbed areas to wind and water erosion;
- Slope roadways and excavations away from washes and clear loose soils and sediments in areas where haul roads would cross surface washes;
- Install washed riprap at the washes;
- Build small earthen embankments within washes to slow or divert surface water;
- Install silt fences in work areas near a wash to prevent sediment from entering the wash during rain storms; and
- Apply water to disturbed soil areas to ensure excessive runoff does not occur and to control wind erosion and dust.

In addition, Rugraw may need to obtain coverage under the State Water Board's Construction General Permit[39], which regulates stormwater runoff from construction sites. Rugraw also proposes general construction measures to prevent stormwater runoff and erosion. See Section 4.10.4.1 for a list of these measures.

Refer to Impacts 4.13–1 and 4.13–3 (Section 4.13, Hydrology and Water Quality) and impacts 4.6–1 and 4.6–3, (Section 4.6, Biological Resources – Aquatic and Fisheries) for analysis of additional water quality issues related to construction.

With the implementation of Rugraw's general construction measures, a SWPPP, and Construction General Permit, if required, the Proposed Project would not result in significant impacts related to soil erosion or the loss of topsoil during construction.

Operation and Maintenance

Refer to Impacts 4.13–1 and 4.13–3 (Section 4.13, Hydrology and Water Quality) and impact 4.6–1 (Section 4.6, Biological Resources – Aquatic and Fisheries) for analysis of additional water quality issues related to erosion during operation and maintenance.

With the implementation of Rugraw's general construction measures and compliance with the Construction General Permit, if required, the Proposed Project would not result in significant impacts related to soil erosion or the loss of topsoil during operation and maintenance.

Construction Impacts

- **Level of Significance:** Less Than Significant Impact
- **Mitigation Measures:** None required

[39] *National Pollutant Discharge Elimination System (NPDES) General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities*. Water Quality Order Number 2009–0009–DWQ and NPDES Number CAS000002, as amended by Order Number 2010–0014–DWQ, Order Number. 2012–0006–DWQ.

Operation and Maintenance Impacts

- **Level of Significance:** Less Than Significant Impact
- **Mitigation Measures:** None required

4.10.4.2 Impacts Related to Unstable Soils

IMPACT 4.10–3: 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 offsite landslide, lateral spreading, subsidence, liquefaction or collapse?

Construction

Spalling, or fragments of stone, and abundant rockfall slope instability are present on the steep canyon walls in the Proposed Project area. However, there is no evidence of deep–seated rotational or translational landsliding (Twining, 2019, CGS, 2011). As concluded in the geotechnical report, the potential for rockfall in the Proposed Project area appears to be naturally controlled by the stability of the area geology., In addition, since the Proposed Project area is not located in a seismic hazard zone, the probability of earthquake–induced geologic hazards would be low (Twining, 2019).

The Proposed Project is not located within an area prone to liquefaction (CGS, 1990). This is based on the mapped geologic units, which suggest that subsurface conditions likely consist of rock. Lastly, there are no expansive soils in the Proposed Project area, which can cause liquefaction. (UBC, 1994).

Erosion from construction activities could impact soil stability and increase the risk of subsidence. Refer to Impacts 4.13–1 and 4.13–3 (Section 4.13, Hydrology and Water Quality) and impact 4.6–1 (Section 4.6, Biological Resources – Aquatic and Fisheries) for analysis of construction–related erosion impacts. With the implementation of Rugraw's proposed general construction measures and erosion control measures, the impact would be less than significant.

Operation and Maintenance

The Proposed Project does not include any ground–disturbing activities during operation or maintenance. Regular operation and maintenance activities (i.e., generating hydropower) would not impact soil stability or cause landslides, lateral spreading, subsidence, liquefaction, or collapse. If any ground–disturbing activities are necessary (e.g., dredging the stream channel or excavation for facilities maintenance), they may require additional permits and certifications (e.g., a Construction General Permit or United States Army Corps of Engineers 404 permit). Rugraw would need to apply for such permits and certifications before performing ground–disturbing activities during operation and maintenance, and any impacts to geology and soil would be analyzed at that time. Any ground–disturbing activities would also be subject to Rugraw's proposed general construction and erosion control measures.

Construction Impacts

- **Level of Significance:** Less Than Significant Impact
- **Mitigation Measures:** None required

Operation and Maintenance Impacts

- **Level of Significance:** No Impact
- **Mitigation Measures:** None required

4.10.4.3 Impacts Related to Expansive Soils

IMPACT 4.10–4: 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?

Construction, Operation, and Maintenance

The Proposed Project area does not contain expansive soils as defined under the Uniform Building Code Table 18–1–B (e.g., soils with clay component) (UBC, 1994). Therefore, the risks to life or property would not be considered substantial and no impact would occur.

Construction, Operation, and Maintenance Impacts

- **Level of Significance:** No Impact
- **Mitigation Measures:** None required

4.10.4.4 Impacts Related to Water Disposal Systems

IMPACT 4.10–5: 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?

Construction, Operation, and Maintenance

The Proposed Project does not include the use of septic tanks or alternative waste water disposal systems. Therefore, the Proposed Project would have no impact related to adequately supporting these systems.

Construction, Operation, and Maintenance Impacts

- **Level of Significance:** No Impact
- **Mitigation Measures:** None required

4.10.4.5 Impacts Related to Unique Paleontological and Geologic Resources

IMPACT 4.10–6: Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

Construction

Paleontological resources are classified as nonrenewable scientific resources and are protected by state statute (Public Resources Code, § 5097.5; CEQA Guidelines, Appendix G), and include the preserved remains or traces of animals, plants, and other organisms from the remote past.

There are no known unique paleontological resources or site or geologic features present in the Proposed Project area. These items are usually found during excavation where it is difficult to determine what exactly was found and to determine whether or not it is "unique". However, the Historic Properties Management Plan (HPMP) requires that if any potentially unique paleontological or geologic feature are found during construction they must be examined to determine uniqueness (Tetra Tech, 2015).

As discussed in Section 4.8, Cultural Resources, HPMP Measure 6, Inadvertent Discoveries of Archaeological Resources, Rugraw prepared an Independent Discoveries Plan (IDP) for the Proposed Project as part of the HPMP. If the construction staff or others observe previously unidentified archaeological resources during construction, they will halt work within a 200–foot radius of the find(s), delineate the area of the find with flagging tape or rope (may also include dirt spoils from the find area), and immediately notify the Proposed Project Archaeologist. Construction will halt within the flagged or roped–off area. The Proposed Project Archaeologist will assess the resource as soon as possible and determine appropriate next steps in coordination with Rugraw and SHPO. Such finds will be formally recorded and evaluated. The resource will be protected from further disturbance or looting pending evaluation.

With implementation of the IDP, the potential to destroy unique paleontological resources or sites or unique geologic features would be minimized. Therefore, the impact would be less than significant.

Operation and Maintenance

There would be few opportunities to encounter a unique paleontological resource during operation and maintenance. However, certain activities (e.g., dredging the stream channel or excavation for facilities maintenance) may uncover previously unidentified archaeological resources. If this occurs, Rugraw will follow the measures outlined in the IDP to preserve these resources. With implementation of the IDP, the impact would be less than significant.

Construction Impacts

- **Level of Significance:** Less Than Significant Impact
- **Mitigation Measures:** None required

Operation and Maintenance Impacts

- **Level of Significance:** Less Than Significant Impact
- **Mitigation Measures:** None required

4.10.5 References

CEQA (California Environmental Quality Act). 2019. Appendix G: Environmental Checklist Form. resources.ca.gov.

CGS (California Geological Survey). 1990. Seismic Hazards Mapping Act. www.conservation.ca.gov

CGS (California Geological Survey). 2002. California Geomorphic Provinces. www.conservation.ca.gov

CGS (California Geological Survey). 2019. California Earthquake Hazards Zone Application. maps.conservation.ca.gov

CGS (California Geological Survey). 2011. Susceptibility to Deep–Seated Landslides in California. www.conservation.ca.gov

Clynne and Muffler. 2010. Geologic Field–Trip Guide to Lassen Volcanic National Park and Vicinity, California. pubs.usgs.gov

FERC (Federal Energy Regulatory Commission). 2018. Final Environmental Impact Statement for Hydropower License.

SMGB (California State Mining and Geology Board). 1972. Alquist–Priolo Earthquake Fault Zoning Act. www.conservation.ca.gov

Tehama (Tehama County). 2009. Tehama County General Plan. www.co.tehama.ca.us

Tetra Tech. 2015. Final License Application Appendix J, Historic Properties Management Plan Lassen Lodge Hydroelectric Project FERC License No. 12396 South Fork Battle Creek Tehama County, California, Volumes I and II. November 10.

Twining Inc. 2019. Geotechnical Feasibility Regarding Diversion Structure, Lassen Lodge Hydroelectric Project FERC No. 12496, South Fork Battle Creek Tehama County, California. August 29.

UBC (Uniform Building Code). 1994. International Conference of Building Officials. digitalassets.lib.berkeley.edu

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4.11 Greenhouse Gas Emissions

This greenhouse gas (GHG) analysis measures the Proposed Project's contribution to the cumulative environmental impact on climate change and discusses potential GHG emissions impacts from construction, operation, and maintenance. The analysis is based on the review of existing resources, technical data, and applicable laws and regulations.

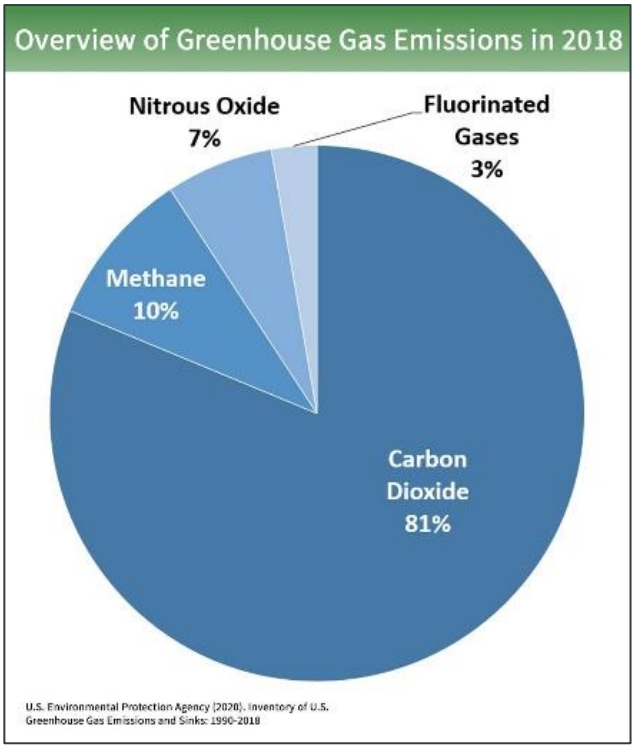
4.11.1 Environmental Setting

Climate change refers to any measurable alteration in climatic conditions that last for an extended period of time – several decades or longer – including changes in temperature, precipitation, and wind patterns. Over the past century, human activities have released large amounts of carbon dioxide (CO_2) and other GHGs into the atmosphere. The majority of GHGs are the by–product of burning fossil fuels to release energy in the form of heat. Deforestation, industrial processes, and some agricultural practices also emit GHGs into the atmosphere. GHGs trap solar energy in the atmosphere and cause it to warm. This phenomenon is called the greenhouse effect and is necessary to support life on Earth; however, excessive buildup of GHGs can change Earth's climate and result in undesirable effects on ecosystems, which affect human health and welfare (USEPA 2017).

Average temperatures have risen across the contiguous 48 states since 1901, with an increased rate of warming over the past 30 years. Eight of the top ten warmest years on record have occurred since 1998. Average global temperatures show the same trend. Within the United States, temperatures in parts of the North, the West, and Alaska have increased the most (USEPA 2017). Seemingly small changes in the average temperature of the planet can translate to large and potentially hazardous shifts in climate and weather. Higher average temperatures are linked to changes in rainfall amounts and distribution that can result in flooding, droughts, or more frequent and severe heat waves. Also, oceans are warming and becoming more acidic, polar ice caps are melting, glaciers are receding, and sea levels are rising due to thermal expansion and ice loss. (USEPA 2017).

4.11.1.1 Greenhouse Gases

GHGs can absorb infrared radiation and trap heat in the atmosphere. As defined in Health and Safety Code section 38505, subdivision (g), primary GHGs include CO_2, methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF_6), and nitrogen trifluoride. CO_2, CH_4, and N_2O are the most significant GHGs in the atmosphere, and account for roughly 98 percent of emissions in the United States.



Some GHGs have a stronger greenhouse effect than others. This is because these gases differ in two key ways which are 1) their ability to absorb energy, and 2) how long they persist in the atmosphere (i.e., lifetime). The Intergovernmental Panel on Climate Change (IPCC) developed the Global Warming Potential (GWP) to compare the climate change impacts between the different GHGs. The GWP measures how much energy the emissions of one ton of a GHG will absorb over a given period of time, usually 100 years, relative to the emissions of 1 ton of CO_2. With CO_2 used as the reference gas, the GWP–weighted emissions are measured in metric tons (MT) of CO_2 equivalent (CO_2e). The GWP is used to convert GHGs to CO2e. This is done by multiplying the mass of the gas emitted by its GWP. For instance, a project that generates 10 MT of CH4, which has a GWP of 28, would be equivalent to 280 MT of CO2e – this is the metric that is used to compare GHGs. The larger the GWP, the more that a given GHG warms the Earth compared to CO2 over that same time period. Table 4.11–1 shows the GWP of the predominant GHGs over a 100–year time horizon.

Table 4.11–1. Greenhouse Gas Global Warming Potentials

GHG	Atmospheric Lifetime (Years)	GWP
Carbon Dioxide (CO_2)	50 – 200[a]	1
Methane (CH_4)	12	28
Nitrous Oxide (N_2O)	114	265
Sulfur Hexafluoride (SF_6)	3,200	23,500

Source: IPCC 2018

a. No single lifetime can be defined for CO_2 because of the different rates of uptake by different removal processes.

4.11.1.2 Regional Setting

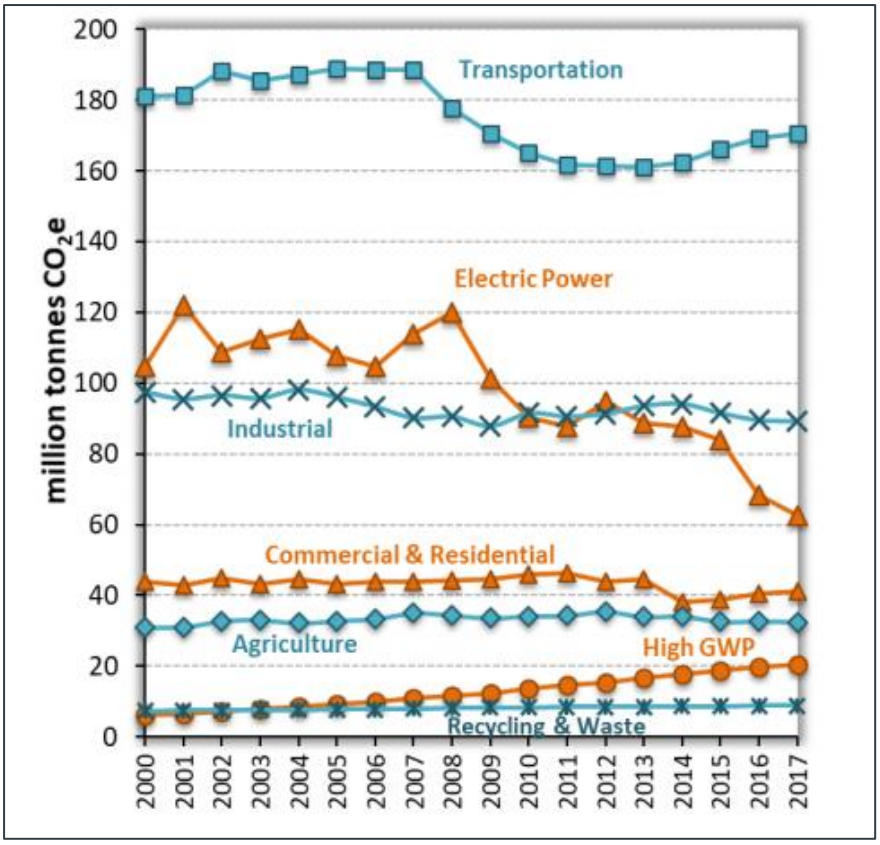
Average temperatures in California have increased by about 1.8 degrees Fahrenheit (°F) since measurements were first recorded in 1895. California has experienced unprecedented temperatures from 2014 through 2017, with 2014 recorded as the warmest year on record. The minimum (nighttime temperatures), mean, and maximum temperatures are all increasing, with the minimum temperature increasing the fastest at 2.3°F per century (OEHHA 2020).

Tehama County is located within the warmer part of the state that experiences hot weather. Consequently, this area is at a greater likelihood of suffering from electrical shortages caused by increased power demand due to higher temperatures. Tehama County's economy also relies on agriculture, tourism, and recreational fishing and boating and will therefore feel the economic impacts from rising temperatures as a result of increases in GHG emissions.

4.11.1.3 State Emissions Inventory

In 2019, California's GHG emissions inventory was updated to include the 2017 emissions data, which show that 2017 generated 424 million metric tons of CO_2e ($MMTCO_2e$) GHG emissions. The transportation sector produced 40.1 percent of the GHG emissions and remains the single largest generator in the state. The industrial sector produced 21.1 percent, and electric power generation produced 14.7 percent of the state's emissions inventory. Other major sectors of GHG emissions include commercial and residential at 9.7 percent, agriculture and forestry at 7.6 percent, and refrigerants and wastes at 6.4 percent (CARB 2020).

More recently, the state's GHG emissions have declined. The 2017 GHG emissions are 5 $MMTCO_2e$ lower than 2016 levels and 7 $MMTCO_2e$ below the 2020 GHG Limit of 431 $MMTCO_2e$ (i.e., 1990 emission levels). A substantial part of the decreasing emissions are due to the reductions in GHGs from the electric sector, where, for the first time since tracking GHG emissions, electricity generation from zero and near zero GHG sources, including hydroelectric power, exceeded generation from GHG emitting sources (CARB 2020). Figure 4.11–1 shows GHG emissions by sector from 2000 to 2017. As shown, the electric power sector has the biggest decrease in emissions starting at a little over 100 $MMTCO_2e$ in 2000 to around 60 $MMTCO_2e$ in 2017. This represents about a 40 percent decrease in GHG emissions from the electric sector. Zero and near zero GHG emissions sources are an important part of realizing GHG emissions reduction goals both now and in the future.



Source: CARB 2020

Figure 4.11–1. 2000–2017 GHG Emissions by Sector

4.11.2 Regulatory Setting

4.11.2.1 Federal

On April 2, 2007, in *Massachusetts v. EPA*, 549 US 497, the Supreme Court found that GHGs are air pollutants covered by the CAA. It is this decision that led the way to developing regulations that limit the amount of GHGs emitted from vehicles and stationary sources (e.g., power plants and refineries). While the federal regulations play an important role in reducing GHGs at the national level, none of the federal regulations are applicable to this Proposed Project.

4.11.2.2 State

California has developed several regulations and goals to reduce GHG emissions within the state. Those relevant to the Proposed Project are summarized below.

Executive Order S–03–05

Executive Order (EO) S–03–05 was signed on June 1, 2005 and established the following GHG emission reduction targets: 1) reduce emissions to 1990 levels by 2020, and 2) reduce emissions to 80 percent below 1990 levels by 2050.

Assembly Bill 32

Assembly Bill (AB) 32, the Global Warming Solutions Act, was signed August 31, 2006 and requires the state to reduce GHG emissions to 1990 levels by 2020 as directed by EO S–03–05. AB 32 includes requirements to adopt rules and regulations to achieve the maximum technologically feasible and cost–effective GHG emissions reductions and directs the California Air Resources Board (CARB) to develop a plan showing how the reductions were going to be achieved. To meet this requirement, in 2008, CARB approved the Climate Change Scoping Plan, which presented key GHG reduction strategies and measures needed to reach the 2020 GHG emissions target. Measures included increased penetration of renewable electricity (33 percent by 2020). This is accomplished in part by the use of renewable energy sources, such as hydroelectric power, to decrease the state's reliance on fossil fuels and reduce GHG emissions. As appropriate, the Climate Change Scoping Plan also acknowledges the importance of providing sufficient transmission lines to allow integration of renewable energy.

The Climate Change Scoping Plan is updated every five years. The first update, approved in 2014, described the progress California made to date on achieving the 2020 GHG emissions target and laid the foundation for continued reductions to meet the longer term 2050 goal. This included energy sector actions and policies to build state–of–the–art energy generation and supply and distribution systems that are clean, affordable, and reliable.

Regulation for Reducing SF_6 Emissions from Gas Insulated Switchgear

The Regulation for Reducing SF_6 Emissions from Gas Insulated Switchgear (GIS) (SF_6 Regulation) was implemented as part of AB 32, which mandates switchgear owners to reduce SF_6 emissions for all active GIS equipment to 1 percent emissions rate by 2020. Amendments to this regulation are currently being proposed that would expand compliance to other GHG insulated equipment (GIE) with a global warming potential of greater than 1. GIE owners would be required to further reduce emissions and to eventually phase out all GIE with alternative technology. These changes would apply to both traditional and renewable energy sources across the electricity transmission and distribution sector.

SF_6 is a commonly used insulator in electricity transmission and distribution equipment, which is the primary source of SF_6 emissions in California. Equipment subject to the SF_6 Regulation are found at many renewable energy facilities that do not otherwise emit GHGs, such as wind, solar, hydropower, and geothermal facilities; however, CARB does allow for certain exemptions. Currently, to receive an exemption the company is required to file an application for exemption, which must show that either SF_6 usage will result in reduced GHG emissions or that there are no viable alternatives. Rugraw is not proposing the use of GIE equipment at this time but may require such equipment in the future.

Executive Order B–30–15

EO B–30–15 was signed April 29, 2015, and established the intermediate GHG emission reduction target of 40 percent of 1990 levels by 2030, which was mandated into law with the signing of SB 32 in 2016. This EO also directed CARB to update the Climate Change Scoping Plan and quantify the state's 2030 GHG reduction goal.

The second update to the Climate Change Scoping Plan, titled California's 2017 Climate Change Scoping Plan, was completed in November 2017. This update outlines the strategy to

achieve the 2030 GHG emissions reduction target. The 2017 Climate Change Scoping Plan update builds upon the previous plans' successes, while identifying new strategies for meeting the GHG emissions reduction targets. The 2017 Climate Change Scoping Plan continues focus on the state's largest stationary and mobile sources of GHG emissions (ARB 2017).

Senate Bill 32

Senate Bill (SB) 32 was signed September 8, 2016 and sets into law the mandated GHG emission reduction target established by EO B–30–15.

Executive Order B–55–18

EO B–55–18 was signed September 16, 2018, and established a new target of statewide carbon neutrality no later than 2045, with negative net emissions thereafter. This includes reviewing opportunities to remove carbon from the atmosphere, such as with sequestration in natural and working lands.

Renewables Portfolio Standard (RPS)

California's RPS, signed in 2002, mandated that utilities – investor, municipal and publicly owned – deliver 20 percent of their electricity from eligible renewable energy sources by 2017. SB 107, passed in 2006, changed this mandate to 20 percent by 2010. SB X1–2, passed in 2011, extended the RPS procurement requirements to 33 percent by 2020. SB 350, passed in 2015, further extended the RPS procurement requirements to 50 percent by 2030. In 2018, SB 100 was signed into law, raising the RPS requirements to 60 percent by 2030 and 100 percent by 2045. Renewable energy sources that count toward RPS procurement requirements include solar, wind, biomass, geothermal, and small hydroelectric facilities (facilities that generate 30 MW or less).

4.11.2.3 Local

Tehama County Air Pollution Control District

The Tehama County Air Pollution Control District (TCAPCD) is responsible for planning, implementing, and enforcing federal and state ambient air quality standards (AAQS) within the Tehama County portion of the Northern Sacramento Valley Planning Area (NSVPA). As part of its planning responsibilities, the TCAPCD developed the Guidelines for Assessing Air Quality Impacts (GAAQI).

Guidelines for Assessing Air Quality Impacts

The GAAQI is an advisory document to help address potential GHG impacts from projects within its jurisdiction, and consistent with CEQA requirements. The GAAQI define the criteria used by the TCAPCD to determine when a climate change analysis is necessary, the type of analysis that should be performed, the significance of the impacts predicted by the analysis, and the mitigation measures needed to reduce overall GHG impacts (TCAPCD 2015).

Other than the TCAPCD's GAAQI, there are no local regulations or policies aimed at reducing GHG emissions that are applicable to this project. The GAAQI includes recommended guidance for analyzing a project's impacts under CEQA and will be discussed further below.

4.11.3 Analysis Methodology

Climate change is not limited to a particular project area. A project, regardless of size, does not generate enough GHG emissions on its own to significantly influence climate change; hence, the issue of climate change is a cumulative environmental impact. This GHG analysis is prepared in accordance with the requirements of CEQA to determine if the Proposed Project would result in significant cumulative GHG impacts. The GAAQI was developed by the TCAPCD as guidance for analyzing and mitigating GHG impacts and is used in this analysis.

The Proposed Project involves the construction and operation of a 5–MW hydroelectric facility that would interconnect with a PG&E transmission line and supply renewable energy to end users in the state. An average of approximately 25,000 MWh of hydroelectric power would be generated annually. The hydroelectric power generated from this Proposed Project could replace power generation from fossil fuel energy sources that emit GHGs. Operation of the Proposed Project would involve up to four weekly vehicle trips for operations, with minimal energy needed for operation of Proposed Project facilities (e.g., lighting and equipment). Maintenance activities would require up to 24 vehicle trips annually, over a 2– to 4–week period.

4.11.3.1 Analytical Approach

This analysis focuses on the GHG impacts from the Proposed Project's estimated construction–related and operational emissions and the overall benefits from Proposed Project operations. Construction–related GHG emissions, while generally short–term, can persist in the atmosphere for a long period and contribute to cumulative global GHG impacts. GHG emissions from construction would be generated from fuel combustion from off–road construction equipment, on–road mobile sources delivering materials and construction workers to and from the site, and helicopter operations. Operation activities for the Proposed Project would involve up to four weekly vehicle trips with minimal energy needed to operate the facilities (e.g., lighting and equipment). Maintenance activities would involve up to 24 vehicle trips annually, over a two– to four–week period. While emissions from operation and maintenance is negligible, operational emissions are being quantified for informational purposes.

Rugraw is not proposing the use of GIE at this time and therefore, potential GHG emissions from GIE are not be quantified. Rather a qualitative analysis is provided in the event GIE are included at a later date.

Construction, Operation, and Maintenance Emissions

Excluding emissions from helicopter use during construction, the Proposed Project's estimated GHG emissions from construction, and operation (excluding potential SF_6 emissions – see above discussions) and maintenance activities were quantified using the California Emissions Estimator Model (CalEEMod), Version 2016.3.2. Construction emissions input data include the Proposed Project–specific location information, equipment list and hours of operation, schedule, and estimated vehicle trip quantities and length (see Appendix B for detailed information). The timing of individual construction activities is unknown; therefore, it is assumed that all construction activities would be condensed during the one proposed construction season from April 15 to October 15.

Operational and maintenance emissions input data includes the weekly and annual vehicle trips, as described above, along with energy usage for lighting and equipment. To capture energy

usage in CalEEMod the “general light industry” land use was selected, which represents a conservatively high estimate since this land use type contains onsite energy consumption emission rates for onsite employees, which would not be needed for this Proposed Project.

Helicopter Assumptions

A helicopter would be used to assist in the installation of transmission lines and poles at locations too difficult to reach by road. It is assumed than no more than one helicopter would be used at any one time and operated 5 days a week throughout the entire construction season. The multipurpose area near the Old Highway 36 Bridge would serve as the landing site. The helicopter would return to Redding Airport or another appropriately equipped facility at the end of each day, and for re–fueling. The helicopter emissions were estimated using GHG emissions factors from the California Climate Action Registry (CCAR) General Reporting Protocol, Version 3.1, and are included in Appendix B.

4.11.3.2 Criteria for Determining Significance

Thresholds of Significance for Greenhouse Gases

The GAAQI contains a screening threshold of 900 MT CO_2e per year. The TCAPCD defines this as the “screening threshold for determining when a climate change analysis is needed” and is “being used by the TCAPCD as a conservative criterion for determining which projects require further analysis and mitigation with regard to Climate Change.” The GAAQI specifies minimum contents for a climate change analysis that includes an emissions inventory with clearly stated significance guidelines to determine significant impacts.

Because impacts from construction activities occur over a relatively short–term period of time, many air districts, including the TCAPCD, are recommending these emissions be amortized over the project lifetime. Amortizing construction emissions over project lifetime allows the construction GHG emissions to be addressed as part of the operational GHG reduction strategies, if needed, since GHG emission reduction measures for construction equipment are relatively limited.

To combine the construction emissions with the operational and maintenance emissions for the Proposed Project, the construction emissions are amortized over a 30–year time period (i.e., average lifespan of a project before improvements are needed). Hydropower projects often have a longer lifespan, around 50 years, as these facilities can operate for long periods of time without needing major replacements or repairs (NHA 2020). The 30–year time frame will be used for this analysis which represents a more conservative (higher emissions) approach.

For the purpose of this Proposed Project, the combined GHG emissions for construction (amortized over the Proposed Project lifetime), operation, and maintenance are compared against the 900 MT CO_2e per year screening threshold. If the Proposed Project’s combined emissions are below the screening threshold then no additional quantitative analysis is needed, and impacts would be less than significant. If the emissions exceed the screening threshold then a climate change analysis is to be conducted in accordance with GAAQI, Section 3.12, to determine significance.

CEQA Guidelines Appendix G

Based on the Appendix G of the 2020 CEQA Guidelines, the Proposed Project would have a significant impact if it would:

- Generate greenhouse gas emissions, either directly or indirectly, that would exceed the 900 MT CO_2e per year screening threshold; or
- Conflict with any applicable plan, policy, or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases.

4.11.4 Environmental Impacts and Mitigation

The Proposed Project does not include any environmental measures that specifically address GHG impacts.

4.11.4.1 Impacts Related to Greenhouse Gas Emissions

IMPACT 4.11–1: Would the project generate greenhouse gas emissions, either directly or indirectly, that would exceed the 900 MT CO_2e per year screening threshold?

Construction

The TCAPCD recommends combining construction and operational emissions when assessing GHG impacts. To do this, construction emissions are amortized over the project lifetime. While hydropower projects often have a 50 year or longer lifespan, a 30–year project lifetime is used and represents a more conservative (higher emissions) approach.

The Proposed Project would contribute to climate change through direct emissions of GHG (primarily CO_2) from construction, including off–road equipment, worker vehicle and haul trips, and helicopter operations. Table 4.11–2 summarizes the estimated GHG emissions from construction, including helicopter operations, amortized over a 30–year period.

Table 4.11–2. Estimated Annual Construction–Related GHG Emissions

Type of Activity	GHG Emissions (MT CO2e)
Construction Emissions – Year 2021a	267
Helicopter Emissions – Year 2021a	729
Total Construction Emissions	996
Amortized Construction Emissions b	33

a. Construction is anticipated to occur during one construction season from Apr 15 to Oct 15.

b. Amortized emissions represent the project's total construction emissions divided by 30 years.

The amortized GHG construction emissions result in the production of 33 MT CO_2e per year.

Operation and Maintenance

Operation and maintenance activities that would emit GHGs include weekly and annual vehicle trips and energy usage for lighting and equipment. Table 4.11–3 summarizes the estimated

GHG emissions from operation and maintenance activities and the amortized construction emissions combined.

Table 4.11–3, Estimated Annual GHG Emissions from Operation and Maintenance, and Amortized Construction

Proposed Project Activity	GHG Emissions (MT CO2e)
Operations and Maintenance	5
Amortized Construction Emissions [a]	33
Total	38

a. See Table 4.11–2

As shown in the above table, combined construction (amortized over the Proposed Project lifetime), operation, and maintenance activities are well below the screening threshold of 900 MT CO_2e per year. Therefore, and the impact would be less than significant.

Construction, Operation, and Maintenance Impacts

- **Level of Significance:** Less Than Significant Impact
- **Mitigation Measures:** None required

4.11.4.2 Impacts Related to Greenhouse Gas Plans, Policies, and Regulations

IMPACT 4.11–2: Would the project conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

Construction

TCAPCD's GAAQI use an emissions screening threshold of 900 MT CO_2e to determine whether a project will release a significant amount of GHGs and trigger the need for a more detailed climate change analysis. When analyzing GHG emissions from construction, TCAPCD recommends amortizing construction emissions over the project lifetime. As shown in Impact 4.11–1, the Proposed Project's amortized GHG emissions from construction would be 33 MT CO_2e per year.

Operation and Maintenance

The Proposed Project would operate in run–of–river mode and is estimated to generate an average of 25,000 MWh of hydroelectric power annually. There would not be any water storage associated with this Proposed Project, meaning operations are solely dependent on runoff, making the Proposed Project an intermittent power source. This means that it cannot be scheduled to produce specific amounts at specific times. Nevertheless, implementation of the Proposed Project would still provide a renewable energy source that could replace non–baseload power generation from fossil fuel energy sources. The approximate amount of non–baseload power generation the Proposed Project could replace is calculated below.

The GHG emissions factor for non–baseload power generation is 873.871 lbs CO_2e per MWh (EPA 2020b). The Proposed Project would generate an estimated 25,000 MWh per year. To

calculate the amount of avoided GHG emissions, multiply the non–baseload power generation GHG emissions factor by the Proposed Project's estimated annual generation. Thus, the Proposed Project would avoid an estimated 21,846,775 lbs CO_2e, or 9,910 MT CO_2e, per year. This equates to 297,300 MT CO_2e over 30 years. This would support California's mandated goals for achieving the GHG emissions targets by replacing non–based load power generation, per AB 32, CARB's Climate Change Scoping Plan, EO B–30–15, and RPS requirements

Rugraw is not proposing to use GIE at this time, but this equipment may be required in the future. The use of GIE emits SF_6, a GHG with a GWP of 23,500. If Rugraw does use GIE, it could conflict with implementation of AB 32 by releasing significant amounts of SF_6 and would be a significant impact. To prevent this impact, Rugraw agreed to implement Mitigation Measure GHG–1, which would require compliance with the SF_6 Regulation. With implementation of Mitigation Measure GHG–1, impacts from emissions of GHG associated with potential use of GIE during Project operations would be less than significant, and would not conflict with the implementation of AB 32.

California's adopted plans, policies, and regulations aimed at reducing GHG emissions recognize the important role of renewable energy, like small hydroelectric projects, to achieve GHG emission reductions. Implementation of the Proposed Project would serve as a renewable energy source and would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions. With the implementation of Mitigation Measure GHG–1, impacts related to generating GHG emissions would be less than significant with mitigation incorporated.

Construction, Operation, and Maintenance impacts

- **Level of Significance:** Less Than Significant with Mitigation Incorporated
- **Mitigation Measure GHG–1: Compliance with CARB Regulation for Reducing Sulfur Hexafluoride Emissions from Gas Insulated Switchgear.** If it is determined that Gas Insulated Switchgear is required for the Proposed Project, and is not exempt from the SF_6 Regulation (Title 17 of the California Code of Regulations, sections 95350 et seq.), Rugraw shall comply with the requirements of this regulation. This includes reporting annually to CARB that use of the equipment does not exceed the maximum allowable rate of 1 percent.

Significance after Mitigation

Implementation of this measure would reduce potential conflicts with applicable plans, policies and regulations to a less–than–significant level.

4.11.5 References

California Air Resources Board. 2019. California Greenhouse Gas Emissions for 2000 to 2017, Trends of Emissions and Other Indicators. 2019 Edition. Available at: ww2.arb.ca.gov.

California Air Resources Board. 2020. GHG Global Warming Potentials. Accessed on May 16, 2020. Available at: ww2.arb.ca.gov.

California Code of Regulations, Title 17, section 95356, Annual Reporting Requirements.

California Office of Environmental Health Hazard Assessment. 2020. Annual Air Temperature. Available at: oehha.ca.gov. Accessed on May 20, 2020.

Intergovernmental Panel on Climate Change. 2018. Fifth Assessment Report, Climate Change 2013: *The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Stocker, T.F., D. Qin, G.–K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, 1535 pp.

National Hydropower Association. 2020. Affordable. Available at: www.hydro.org.

Tehama County Air Pollution Control District. April 2015. Air Quality Planning and Permitting Handbook, Guidelines for Assessing Air Quality Impacts.

United States Environmental Protection Agency (USEPA). 2017. Climate Change Indicators in the United States. Search 1/19/2017 Snapshot. Available at: 19january2017snapshot.epa.gov. Accessed February 2018.

United States Environmental Protection Agency (EPA). 2020a. “Inventory of Greenhouse Gas Emissions and Sinks: 1990–2018. April 13, 2020. Available at: www.epa.gov

United States Environmental Protection Agency (EPA). 2020b. “Emissions & Generation Resource Integrated Database (eGRID), 2018.” Washington, DC: Office of Atmospheric Programs, Clean Air Markets Division. Available at: www.epa.gov.

4.12 Hazards and Hazardous Materials

This section discusses potential impacts related to hazards and hazardous materials that could occur from construction, operation, and maintenance of Proposed Project. If necessary, mitigation measures are identified for potentially significant impacts. Proposed Project impacts are related to the use, transport, and disposal of hazardous materials; the potential for accidental releases of hazardous materials; or the exposure to existing sources of contamination from hazardous materials.

This section also evaluates potential hazards, such as whether construction and operation of the Proposed Project would impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan. Other hazards addressed in this EIR include: geologic and seismic hazards in Section 4.10, Geology and Soils, and soil and flooding hazards in Section 4.13, Hydrology and Water Quality. Impacts associated with the exposure of people or structures to a significant risk of loss, injury, or death involving wildland fires is addressed in Section 4.19, Wildfire.

4.12.1 Terminology

Hazards can be human–caused, such as dam failures and electrical fires, or naturally caused, such as earthquakes, lightning–caused fires, and extreme weather. Hazardous materials are substances that, because of their quantity, concentration, or physical or chemical characteristics, pose a significant present or potential hazard to human health and safety or to the environment if released into the workplace or the environment.[40] Examples of hazardous materials considered in this analysis include fuels, lubricants, and solvents, which are commonly used during construction and operation.

Hazardous materials and waste are defined as substances that have the potential to be harmful or dangerous to human health and/or the environment. The federal Resource Conservation and Recovery Act (RCRA) (42 U.S.C. § 6901 et seq.) catalogs these materials by hazard type, such as ignitability, corrosivity, reactivity, and toxicity. Common examples of hazardous materials include gasoline, types of lubricants and oils, and cleaning solvents (DTSC 2020).

4.12.2 Environmental Setting

EnviroStor and GeoTracker are online mapping databases managed by the California Department of Toxic Substances Control (DTSC) and the State Water Board, respectively. EnviroStor maps hazardous waste facilities and contaminated sites including Federal Superfund sites, Permitted Treatment, Storage, and Disposal Facilities, and Voluntary Cleanup sites. GeoTracker maps sites that have the potential to impact water quality including Leaking Underground Storage Tank (LUST) sites, Department of Defense Sites, Oil and Gas Production sites, and Land Disposal Sites.

Well Finder and California Natural Gas Pipeline are additional online mapping databases, managed by the Geologic Energy Management Division and California Energy Commission, respectively. Well Finder shows existing and past well sites. The California Natural Gas Pipeline site shows the location of natural gas pipelines.

[40] Health and Safety Code section 25501, subdivision (n)(1).

The Proposed Project is located on the northeast side of unincorporated Tehama County. This part of Tehama County is characterized by forests and some shrub/scrub vegetation, with areas of grassland, developed open space, and low and medium intensity residential development. With minimal industry and commercial facilities in northeast Tehama County, there are no current recorded hazardous sites (EnviroStor 2020, GeoTracker 2020). Thus, the most likely exposure to hazardous materials in the area is associated with fuels transportation and construction activities. Release of hazardous materials can also be associated with oil and gas resources and infrastructure. There are no wells (oil or geothermal) or natural gas pipelines in the Proposed Project area (GEM 2020, CEC 2018).

4.12.2.1 Regional Setting

Given the environmental setting of the Proposed Project area, the most common regional hazards are flood, wildfire, slope failure, dam failure, and earthquake (Tehama County MJHMP 2018).

4.12.3 Regulatory Setting

4.12.3.1 Federal & State

Hazardous Materials Management

RCRA was passed to protect both human health and the environment from improperly managed hazardous waste. RCRA gives states primary responsibility to implement the program. RCRA regulates solid wastes hazards and nonhazardous waste. The US Environmental Protection Agency (EPA) has compiled a list of hazardous wastes (EPA 2020).

Since 1992 California's DTSC has implemented the RCRA regulations and additional State requirements. Through these regulations various hazardous waste and contaminated sites are disclosed. Government Code section 65962.5 mandates that the California DTSC shall maintain yearly up–to–date list of hazardous waste sites (DTSC 2020).

California Health and Safety Code, chapter 6.95, requires that if businesses have substantial amounts of solid hazardous material, compressed gas, or radioactive material they must create a Hazardous Material Business Plan (HMBP). This plan details how the business will respond to an emergency to ensure that the hazardous materials are effectively contained and managed to ensure minimal damage to the environment and human health (Tehama County 2009).

Worker Safety

Occupational safety standards exist in federal and state laws to minimize worker safety risks from both physical and chemical hazards in the workplace. The California Division of Occupational Safety and Health (Cal/OSHA) and the federal Occupational Health and Safety Administration (OSHA) are the agencies responsible for ensuring worker safety in the workplace.

Cal/OSHA assumes primary responsibility for developing and enforcing standards for safe workplaces and work practices; regulations specifically addressing protection of construction workers from exposure to hazardous substances are found in title 8 of the California Code of Regulations. California Code of Regulations, title 8, section 1510 requires that workers be given instructions regarding the hazards and safety precautions applicable to the type of work in

question, that employers shall permit only qualified persons to operate equipment and machinery, and that where employees are subject to known job hazards, such as flammable liquids and gases and toxic materials, they shall be instructed in the recognition of the hazard, in the procedures for protecting themselves from injury, and in the first aid procedure in the event of injury. Other sections include requirements related to fire protection and prevention; the release of dust, fumes, vapors, and gases; explosives; haulage and earth moving; vehicles, traffic control, flaggers, barricades, and warning signs; demolition; use of oxygen, acetylene, and fuel gas; electrical requirements; and other safety issues. At sites known to be contaminated, a Site Safety Plan must be prepared that establishes policies and procedures to protect workers and the public from exposure to potential hazards at the contaminated site.

4.12.3.2 Local

Emergency Response

The Tehama County Fire Department requires all personnel to have a minimum training of *First Responder Haz Mat Operational* and some CAL FIRE employees have additional training and are certified *Hazardous Materials Technical Specialists*. While these employees have no legal responsibility to respond to hazardous materials incidents, they are generally first to an emergency situation and will respond accordingly to protect human health and property (Tehama County 2009). Tehama County also participates in the Shasta Cascade Hazardous Materials Response Team (SCHMRT), which promptly responds to hazardous materials emergencies. The SCHMRT focuses on immediate action to mitigate the effects of an incident. The SCHMRT does not perform site cleanup and hazardous material removal (Shasta County 2018).

The Tehama County Emergency Operations Plan (EOP) is a comprehensive emergency and disaster plan that specifies the roles of organizations and policies to manage these situations. The EOP adopts the National Incident Management System (NIMS) and the Standardized Emergency Management System (SEMS) (Tehama County EOP 2017). SEMS details the structure and organization of a multi–agency response. There are various levels of response from field to State.

The federal Disaster Mitigation Act (DMA) of 2000 requires proactive disaster planning. To comply with the requirements of the DMA, Tehama County published the Tehama County Multi–Jurisdictional Hazard Mitigation Plan (MJHMP). The Plan identifies the local hazards within Tehama County and the incorporated cities and employs mitigation measures to minimize these hazards and their effect on the community (Tehama County MJHMP 2018).

Tehama County General Plan

The Tehama County General Plan, Safety Element, provides policies applicable to hazards and hazardous material impacts (that are not discussed in the other EIR sections, as noted above).

- *POLICY SAF–1.1*: The County shall prepare for emergencies and disasters prior to their occurrence by developing, maintaining, and implementing an Emergency Disaster Plan consistent with the requirements of state law.
  - *Implementation Measure SAF–1.1c*: Maintain, periodically update, and test the effectiveness of the County's Emergency Disaster Plan.

  - *Implementation Measure SAF–1.1d*: Participate in the Standardized Emergency Management System (SEMS) and the NIMS, and comply with the State of California Emergency Services Act.

- *POLICY SAF–1.4*: The County shall endeavor to maintain acceptable levels of risk of injury, death, and property damage resulting from reasonably foreseeable safety hazards in Tehama County.
  - *Implementation Measure SAF–1.4a*: Conduct an evaluation, as part of the CEQA process, of the potential safety hazards of proposed development within the County and mitigate impact as appropriate and practical to ensure a reasonable level of safety for residents, workers, and property owners.

4.12.4 Analysis Methodology

4.12.4.1 Analytical Approach

This analysis addresses potential impacts from the use, storage, and transportation of hazardous materials, as well as the potential for other hazardous conditions. The Proposed Project's impacts from hazards and the use, transport, and storage of hazardous materials and how it would affect existing hazards in the area are also addressed. Additionally, the Proposed Project was analyzed against applicable regulations, such as emergency preparedness plans, to demonstrate consistency with the existing regulatory setting. The area of assessment of potential impacts is the area within the Proposed Project boundary, as shown in Figure 2–1.

4.12.4.2 Criteria for Determining Significance

Based on Appendix G of the 2020 CEQA Guidelines, the Proposed Project would have an impact if it would:

- Cause substantial exposure to hazardous materials, where substantial is defined as quantities of hazardous, or acutely hazardous, materials that would be harmful to the public or the environment;
- Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one–quarter mile of an existing or proposed school;
- 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 it create a significant hazard to the public or the environment;
- 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, result in a safety hazard or excessive noise for people residing or working in the project area;
- Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan; or
- Expose people or structures, either directly or indirectly, to a significant risk of loss, injury, or death involving wildland fires.

4.12.5 Applicant's Proposed Measures

Rugraw has proposed general construction measures, various resource protection measures, and is required to implement Environmental Management and Monitoring Plans. Relevant measures, management and monitoring plans, and are discussed below.

4.12.5.1 General Construction Measures

7. Develop a construction plan to be filed for FERC approval prior to the start of ground–disturbing activities. This construction plan should also be closely coordinated with the SWPPP.
8. Limit land disturbance and vegetation clearing to those areas needed for construction. Delineate the limits of construction, work areas, and multipurpose areas with flagging, fencing, and/or stakes to prevent land–disturbing activities outside of construction areas.
4. Develop a Stormwater Pollution Prevention Plan (SWPPP) with measures to prevent storm–induced erosion and sedimentation during ground–disturbing construction activities, including:

c. Store spoils from Project construction in areas that limit erosion of spoil material and prevent runoff into aquatic habitats.

d. Install cofferdams, silt fences, or other structures to isolate in–water work areas and only use washed riprap, rocks, and gravel adjacent to or in watercourses.

As stated in FERC's Final EIS (Section 3.3.1.2, Environmental Effects, page 33), Rugraw would also implement a SWPPP that outlines measures to prevent erosion and sedimentation during Proposed Project construction. The SWPPP would include, at a minimum, provisions to:

- Limit surface disturbance to only those areas necessary for construction, thereby preserving existing vegetation;
- Salvage and stockpile topsoil and following construction, replace, regrade and seed topsoil with native vegetation;
- Use temporary fencing and protective barriers to protect vegetation not required to be removed;
- Initiate construction immediately following vegetation clearing to minimize the exposure of disturbed areas to wind and water erosion;
- Slope roadways and excavations away from washes and clear loose soils and sediments in areas where haul roads would cross surface washes;
- Install riprap at the washes;
- Build small earthen embankments within washes to slow or divert surface water;
- Install silt fences in work areas near a wash to prevent sediment from entering the wash during rain storms; and
- Apply water to disturbed soil areas to ensure excessive runoff does not occur and to control wind erosion and dust.

Rugraw also proposes cofferdams and other structures to isolate in–water work areas and allow for construction "in the dry." Other proposed BMPs include installation of sedimentation basins for capturing solids in stormwater runoff; placement of construction materials to avoid erosion from flowing water, and construction of permanent roads with gravel depth and quantity to maintain a stable road surface.

4.12.5.2 Noxious Weed Management and Revegetation Plan

The Noxious Weed Management and Revegetation Plan includes measures to ensure weeds and non–native invasive vegetation do not reestablish at onsite disposal areas during Proposed Project construction, with modifications. The modifications include provisions for riparian plantings along disturbed portions of South Fork Battle Creek to provide overhanging vegetation, monitoring of restoration success, criteria for additional reseeding if by the end of a 2–year monitoring period the criteria are not met, pre–construction treatment of existing non–native invasive plant populations on Proposed Project lands, and measures to protect rare plant species from control measures targeting noxious weed species.

With the implementation of Rugraw–proposed general construction measures and environmental management plans, construction activities would not result in significant impacts related to hazardous materials releases. The impact would be less than significant.

4.12.6 Environmental Impacts and Mitigation

4.12.6.1 Impacts Related to Exposure to Hazardous Materials

IMPACT 4.12–1: Would the project create substantial exposure to hazardous materials, where substantial is defined as quantities of hazardous, or acutely hazardous, materials that would be harmful to the public or the environment?

Construction

Proposed Project activities would involve the transport, use, and disposal of certain hazardous materials or substances that could pose a hazard to the environment or public. A spill of hazardous materials (e.g. oil, grease, gasoline, or solvents) during construction activities could cause contamination of the adjacent water bodies. A spill could degrade water quality impacting fish and other aquatic organisms (see *Section 4.6, Biological Resources – Aquatic and Fisheries*).

Operation and Maintenance

Operation and maintenance activities require the use of gas, hydraulic fluid, lubricants, solvents, and oils for ongoing maintenance of mechanical facilities. In addition, the use of herbicides would occur for invasive plant treatments and vegetation management activities along transmission and distribution lines. Given the size and nature of the Proposed Project, it is not anticipated a HMBP will be required since substantial amounts of hazardous materials would not be used. However, as noted above, Rugraw is required to develop and implement a SWPPP, which typically requires cleanup of materials onsite at all times; identification of spill prevention, containment, and cleanup measures; and specification of appropriate emergency response measures. The Noxious Weed Management and Revegetation Plan would include

measures to protect biological resources from herbicide treatment. Refer to *Section 4.6, Biological Resources – Aquatics and Fisheries*, and *Section 4.7, Biological Resources – Terrestrial*, which specifically address the protection of biological resources.

Rugraw is required to develop the construction plan in consultation with State Water Board staff, CDFW, USFWS, NMFS and the Central Valley Regional Water Quality Control Board. Construction and maintenance conditions require compliance with the State Water Board's Construction General Permit[41] and a SWPPP.

During the routine transport, use, and disposal of hazardous materials or substances, appropriate measures to contain and clean up hazardous materials would be implemented. With the implementation of Rugraw's General Construction Measures and Environmental Management Plans, impacts related to operation and maintenance would be less than significant.

Construction Impacts

- **Level of Significance:** Less Than Significant Impact
- **Mitigation Measures:** None required

Operation and Maintenance Impacts

- **Level of Significance:** Less Than Significant Impact
- **Mitigation Measures:** None required

4.12.6.2 Impacts Related to Schools

IMPACT 4.12–2: Would the project emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one–quarter mile of an existing or proposed school?

Construction, Operation, and Maintenance

There are no existing or proposed schools within one–quarter mile of the Proposed Project site and construction areas. Given this, there is no potential for hazardous materials or emissions generated from the Proposed Project to impact schools. No impact would occur and no mitigation measures are required.

Construction, Operation, and Maintenance Impacts

- **Level of Significance:** No Impact
- **Mitigation Measures:** None required

[41] *National Pollutant Discharge Elimination System (NPDES) General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities* Water Quality Order Number. 2009–0009–DWQ and NPDES Number CAS000002, as amended by Order Number 2010–0014–DWQ, Order Number. 2012–0006–DWQ.

4.12.6.3 Impacts Related to Hazardous Materials Sites

IMPACT 4.12–3: Would the project 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 it create a significant hazard to the public or the environment?

Construction, Operation, and Maintenance

Government Code section 65962.5 mandates that DTSC maintains a yearly up–to–date list of hazardous waste sites and these sites are cataloged in EnviroStor. There is one EPA cleanup site in Tehama County, Rodgers Ranch, approximately 40 miles southwest from the Proposed Project area in Corning, CA. There is one California cleanup site, Modern Day Cleaners, approximately 30 miles west of the Project area in Red Bluff, CA. Searches of both the EnviroStor and GeoTracker databases in and near the Proposed Project area yielded no current sites. Previous cleanup sites included a few LUSTs in Mineral, CA and a Voluntary Cleanup site at the PG&E Manton Hydro Service Center that have been cleaned up and cleared (EnviroStor 2020 & GeoTracker 2020). Additionally, searches of both Well Finder and California Natural Gas Pipeline maps yielded no results in or near the Proposed Project area.

Therefore, the Proposed Project would not result in impacts from a listed hazardous materials site or create any subsequent hazard to the public or environment.

Construction, Operation, and Maintenance Impacts

- **Level of Significance:** No Impact
- **Mitigation Measures:** None required

4.12.6.4 Impacts Related to Airports

IMPACT 4.12–4: 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, would the project result in a safety hazard or excessive noise for people residing or working in the project area?

Construction, Operation, and Maintenance

The Double Creek Ranch Airport is the nearest private airstrip located approximately 1.5 miles north of the closest point of the transmission line. The nearest public airport is Shingletown Airport located approximately 7 miles from the transmission line. The Double Creek Ranch Airport does not have an airport land use plan.

While operations at this private facility may at times be audible at the Proposed Project site, the relatively limited and sporadic use of this airport for corporate travel or other limited uses, coupled with the distances between it and the Proposed Project site, would result in negligible amounts of noise at the Proposed Project site. As such, development of the Proposed Project would not expose people residing or working in the Proposed Project area to excessive noise. No impact would occur.

Section 4.17, Transportation, identifies safety hazards related to the transmission line. Placement of poles and towers with the use of a helicopter could temporarily conflict with aircraft from local airports. However, Rugraw will obtain the appropriate FAA permit for construction and placement of the transmission line, poles, and towers to minimize potential conflicts with aircraft traffic in the area. In addition, Rugraw will also coordinate all Proposed Project helicopter operations with local airports before and during project construction[42]. Compliance with FAA requirements would reduce potential hazard impacts from helicopter use to less than significant.

Construction, Operation, and Maintenance Impacts

- **Level of Significance:** Less Than Significant
- **Mitigation Measure:** None required

4.12.6.5 Impacts Related to Emergency Response Plans

IMPACT 4.12–5: Would the project impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?

Construction, Operation, and Maintenance

The Proposed Project would not involve any material changes to public streets, roads, or evacuation infrastructure. Although operation and maintenance of Proposed Project facilities would not substantially result in inadequate emergency access, construction activities could delay or impair emergency vehicle access and evacuation routes. This would be considered a significant impact.

Mitigation Measure FIRE–1 provided under Wildfire Impact 4.19–3 would reduce the impact to less than significant. All electrical corporations, including Independent Transmission Operators (ITO), such as Rugraw, are required to submit a Wildfire Mitigation Plan (WMP) with direction from the CPUC (Rulemaking 18–10–007 updated December 16, 2019 as clarified December 23, 2019). The WMP must be approved by the CPUC and CAL FIRE. The WMP is required to address all stages of a project including construction, operation, and maintenance. The WMP is to be consistent with applicable state laws and regulations for fire prevention and protection, and include identification of fire safety measures, fire prevention and control requirements, and other procedures. The WMP would address coordination with emergency providers to ensure access is maintained if road closures are required.

Implementation of Mitigation Measure FIRE–1 would reduce impacts related to impairing an adopted emergency response plan or emergency evacuation plan to less than significant.

For additional discussion refer to Section 4.19, Wildfire.

Construction, Operation, and Maintenance Impacts

- **Level of Significance:** Less Than Significant with Mitigation Incorporated

[42] Email correspondence between Rugraw and the State Water Board, dated September 7, 2020.

- **Mitigation Measure FIRE–1:** Implement Mitigation Measure FIRE–1, which requires implementation of a WMP that will address all stages of the Proposed Project including construction, operation, and maintenance.

Significance After Mitigation

Implementation of Mitigation Measure HAZ–3 (FIRE–1) would reduce impacts related to impairing an adopted emergency response plan or emergency evacuation plan to less than significant.

4.12.6.6 Impacts Related to Wildfires

IMPACT 4.12–6: Would the project expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires?

Construction, Operation, and Maintenance

CAL FIRE has identified the Proposed Project area as being in a Very High Fire Hazard Severity Zone (FHSZ), which is defined as an area at extreme risk for wildfires. Construction activities, as well as ongoing operation and maintenance of Proposed Project structures, could provide a source of ignition for a fire (e.g., diesel and fuel powered vehicles, welding or cutting, etc.) and thus have the potential to increase the risk of wildland fire occurrence. Any wildfire in the Proposed Project vicinity could threaten infrastructure and people in the vicinity. In addition, transmission lines have been the source of several recent and historically large fires in California. Electric generation and related utility companies have been under increased scrutiny in regards to fire safety practices, especially related to vegetation clearing around infrastructure.

The Proposed Project includes regular vegetation management activities to ensure the safe operation and reliability of the Proposed Project. Minimum clearance distances from conductors must be maintained to prevent fires and outages that could be caused by trees or vegetation damaging the lines. Public Resources Code section 4293, administered by CAL FIRE, requires a 4–foot minimum clearance be maintained for power lines between 2,400 and 72,000 volts, and a 10–foot clearance for conductors 115,000 volts and above. The proposed transmission line is 60 kV, or 60,000 volts. On an annual basis, vegetation management inspections would be conducted. Clearing would be done every other year, or more often as may be required, which would help reduce fire fuels within the Proposed Project area.

The risk of wildfire would continue to be very high, and without mitigation would be a significant impact, but implementation of a Proposed Project–specific WMP, as required by Wildfire Mitigation Measure 1 (FIRE–1) in Section 4.19, Wildfire, would improve public safety by ensuring that Proposed Project construction, operation and maintenance activities are conducted in a manner that would prevent the ignition and spread of wildland fires, and by guiding the response should fires occur. With implementation of Mitigation Measure FIRE–1, the impact related to exacerbating existing wildfire risk in the Proposed Project area would be reduced to less than significant.

For additional discussion refer to Section 4.19, Wildfire.

Construction, Operation, and Maintenance Impacts

- **Level of Significance:** Less Than Significant with Mitigation Incorporated
- **Mitigation Measure FIRE–1:** Implement Mitigation Measure FIRE–1, which requires implementation of a WMP that will address all stages of the Proposed Project including construction, operation, and maintenance.

Significance After Mitigation

Implementation of Mitigation Measure HAZ–3 (FIRE–1) would reduce impacts related to exacerbating existing wildfire risk to less than significant.

4.12.7 References

California Department of Conservation, Geologic Energy Management Division (GEM). Well Finder. 2020. Found at: maps.conservation.ca.gov.

California Department of Toxic Substances Control. EnviroStor. 2020. Found at: www.envirostor.dtsc.ca.gov.

California Energy Commission (CEC). California Natural Gas Pipeline. April 1, 2018. Found at: cecgis–caenergy.opendata.arcgis.com.

California Health and Safety Code, section 25501, subdivision (n)(1).

California State Water Resources Control Board. GeoTracker. 2020. Found at: geotracker.waterboards.ca.gov.

Office of State Fire Marshall, CAL FIRE. Fire Hazard Severity Zones Maps. 2007. Found at: osfm.fire.ca.gov.

Shasta County Environmental Health Division, Departments of Resource Management. Hazardous Materials Area Plan. January 2018. Found at: www.co.shasta.ca.us.

Tehama County Emergency Operations Plan (EOP). April 2017. Found at: tehamaso.org.

Tehama County Multi–Jurisdictional Hazard Mitigation Plan (MJHMP). October 16, 2018. Found at: mitigatehazards.com.

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4.13 Hydrology and Water Quality

This section describes existing hydrology and water quality conditions in the Proposed Project area, identifies associated regulatory requirements, evaluates potential impacts, and identifies mitigation measures related to construction, operation, and maintenance activities of the Proposed Project.

4.13.1 Environmental Setting

4.13.1.1 Regional Setting and Climate

South Fork Battle Creek is a 28–mile–long waterway with its headwaters beginning on the western slopes of the Cascade Range near Lassen Volcanic National Park, 1.5 miles west of the town of Mineral, CA in Tehama County. Along with the North Fork of Battle Creek, South Fork Battle Creek is a major tributary to Battle Creek, a 17–mile–long tributary to the Sacramento River. At its confluence with Battle Creek, South Fork Battle Creek drains an area of 124 square miles. South Fork Battle Creek at the proposed dam/diversion location drains an area of about 33 square miles. Average annual precipitation is 36 inches, most of which falls from October through May.

South Fork Battle Creek joins North Fork Battle Creek downstream of the Proposed Project site, and Battle Creek then flows 16 miles to join the Sacramento River (Figure 4.13–1). Figure 4.13–2 identifies the key stream features in the area of the Proposed Project reach, including Ponderosa Bridge, Panther Creek, Panther Grade, and Angel Falls. Panther Creek enters South Fork Battle Creek just downstream of Panther Grade, which is a falls–boulder cascade at river mile (RM) 18.9 that is a commonly accepted barrier to upstream fish migration (Jones & Stokes, 2005). Although Panther Grade may be passable to fish at some flow levels, Angel Falls (RM 22.3) is a complete barrier to upstream fish migration at all flow levels. Angel Falls is also the upper extent of the Battle Creek Salmon and Steelhead Restoration Project (BCSSRP).

The terrain in the vicinity of the Proposed Project is mountainous with watershed elevations from 3,400–9,000 feet AMSL, and South Fork Battle Creek flows through a deeply incised canyon. The area can be characterized as heavily disturbed by previous logging and road construction. Sierra Pacific Industries (SPI) land that would be traversed by the penstock alignment has been logged within the past 10 years.

4.13.1.2 Hydrology

The United States Geological Survey (USGS) stream gage (1959 to 1967) on South Fork Battle Creek near Mineral, CA (upstream of the Old Highway 36 Bridge at RM 22.5) (Figure 4.13–2) was supplemented via correlation with long–term streamflow data from the USGS Deer Creek near Vina and Mill Creek near Los Molinos gages to develop an extended synthetic flow record (1929–2014) specific to the Proposed Project bypass reach. Table 4.13–1 and Table 4.13–2 show a summary of USGS gage information used to develop the synthetic streamflow record for the Proposed Project bypass reach and monthly average flow data for South Fork Battle Creek near the Proposed Project diversion. In addition, Rugraw collected flow data at the Above Old Highway 36 Bridge Station (ABS) from 2015 to 2019. Figure 4.13–3 and Figure 4.13–4 show time series plots of the Rugraw and synthetic average daily flow data. Figure 4.13–5 shows exceedance plots by month for both sets of data. Figure 4.13–6 shows data collected on November 1, 2014 by Rugraw that illustrates flow along the length of stream (proposed

diversion, RM 23, downstream to the proposed powerhouse, RM 20.6, and below the confluence with Panther Creek, RM 18.9) during the baseflow period of a low flow (drought) year.

Because the Proposed Project watershed is located at relatively high elevation (3,400–9,000 ft), much of the precipitation that falls during the winter occurs as snow. As such, the hydrology of South Fork Battle Creek in the Proposed Project bypass reach is driven by snowmelt, with the highest flows occurring from March through June. Average annual flow in the Proposed Project bypass reach is approximately 60 cfs and average monthly flows range from a low of approximately 9 cfs in September to a high of 122 cfs in May (Tables 4.13–1 and 4.13–2). During the short time the USGS gage near Mineral, CA was operated, maximum flow was 1,210 cfs and the minimum was 3 cfs. Due to a lack of springs upstream of or within the Proposed Project bypass reach, extreme low flows naturally occur in the late summer and fall (Figures 4.13–3, 4.13–4, and 4.13–5). Based on the longer synthetic record (i.e., correlation with the Mill Creek near Los Molinos gage; Rugraw 2014), a 7–day average low flow of zero occurs with a frequency of once every 10 years, and a 7–day average low flow of 4.4 cfs occurs with a frequency of once every 2 years.

Figure 4.13–5 shows a substantial difference in the exceedance hydrology for the longer synthetic period of record (1929–2014) and the shorter Rugraw measured record (2015–209) during the drier summer/fall months. This difference primarily occurs because the shorter record includes a higher proportion of low flow years (e.g., the extreme drought year of 2015 and the low flow year of 2018).

During drought years, such as 2014 and 2015, much of the Proposed Project bypass reach can be naturally dry in the fall (Figure 4.13–6). Spring Number 4 (RM 20.84), located 0.24 miles upstream of the proposed powerhouse, measured at 0.3 cfs in October 2014, and was the only detectable source of year–round surface inflow in the Proposed Project bypass reach (Cramer et al., 2015). Conversely, downstream of the Proposed Project, South Fork Battle Creek exhibits high base flow throughout the summer and fall with water entering the creek from numerous cold springs that emanate from volcanic rock downstream of Panther Grade at RM 18.9 (Figure 4.13–6).

Table 4.13–1. Streamflow information for gages used in developing the synthetic flow record for South Fork Battle Creek (Source: USGS, 2017a,b)

Gage Name	South Fork Battle Creek near Mineral	Mill Creek near Los Molinos	Deer Creek near Vina
Gage number	11376400	11381500	11383500
Mean basin elevation (feet–msl)	5,702	3,961	4,199
Drainage area (square miles)	33.2	131.4	208.7
Dates of operation	1960–1967	October 1, 1928 to June 20, 2017	October 1, 1911, to September 29, 1915; April 1, 1920 to June 20, 2017

Gage Name	South Fork Battle Creek near Mineral	Mill Creek near Los Molinos	Deer Creek near Vina
Mean flow (cfs)	60	304	322
Maximum flow (cfs)	608	14,400	20,100
Minimum flow (cfs)	4	52	52

Table 4.13–2. Minimum, maximum, and mean monthly flow values for South Fork Battle Creek at the Project site (Source: Rugraw, 2014, as modified by FERC staff)

Month	Minimum Flow[a] (cfs)	Mean Flow[b] (cfs)	Maximum Flow[a] (cfs)
Jan	8	69	561
Feb	15	80	986
Mar	14	86	435
Apr	42	117	577
May	41	122	534
Jun	14	81	387
Jul	7	28	214
Aug	4	12	62
Sep	4	9	29
Oct	3	13	983
Nov	6	27	290
Dec	6	57	1,210

a Observed streamflow values from USGS South Fork Battle Creek near Mineral gage (1959–1967).

b Mean flow values were derived from a synthetic flow record using Mill Creek near Los Molinos flow values (1928–2017).

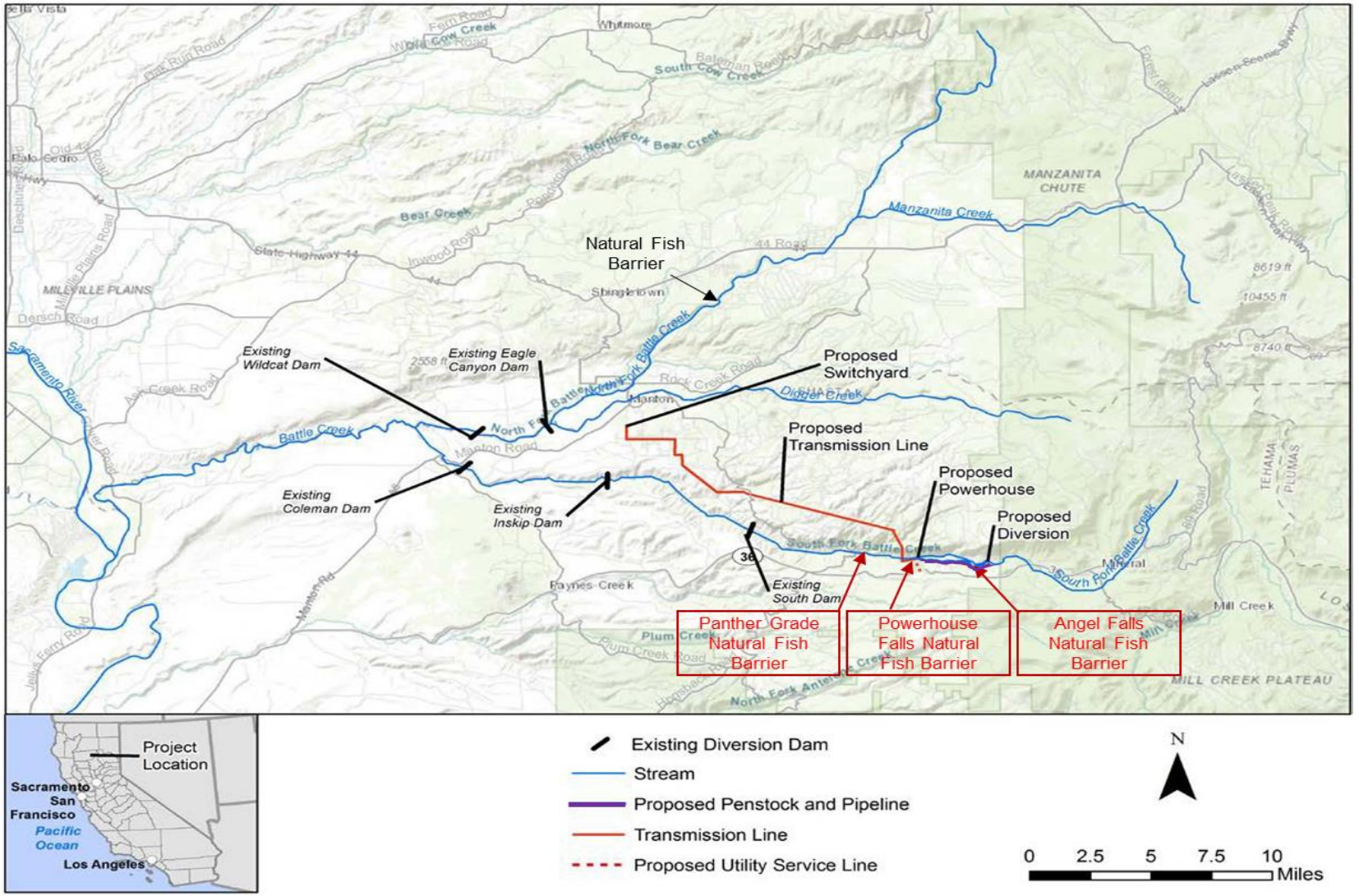
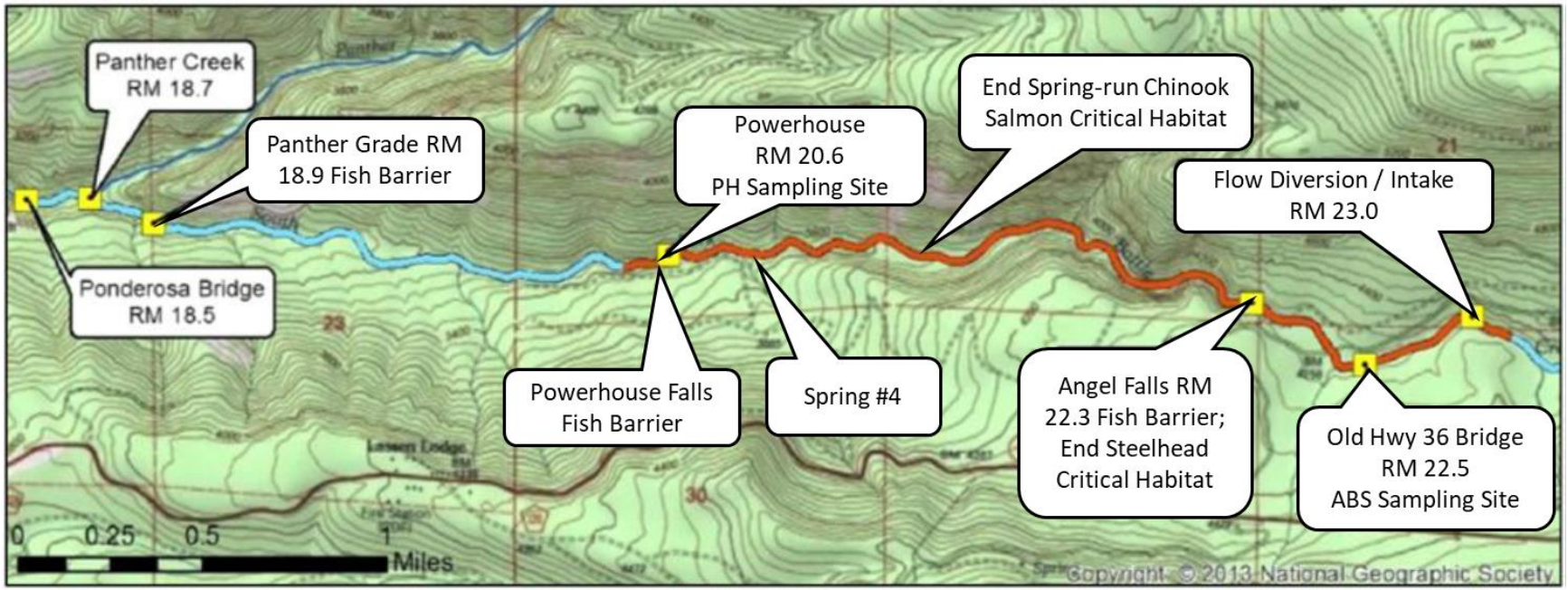


Figure 4.13–1. Battle Creek Basin Map Showing Location of Proposed Project



Source: Cramer et al., 2015

Figure 4.13–2. Area Map Showing the Proposed Project Diversion and Powerhouse, including River Miles (RM); Upstream Natural Fish Barriers; Critical Fish Habitat Upstream End Points; and Sampling Locations

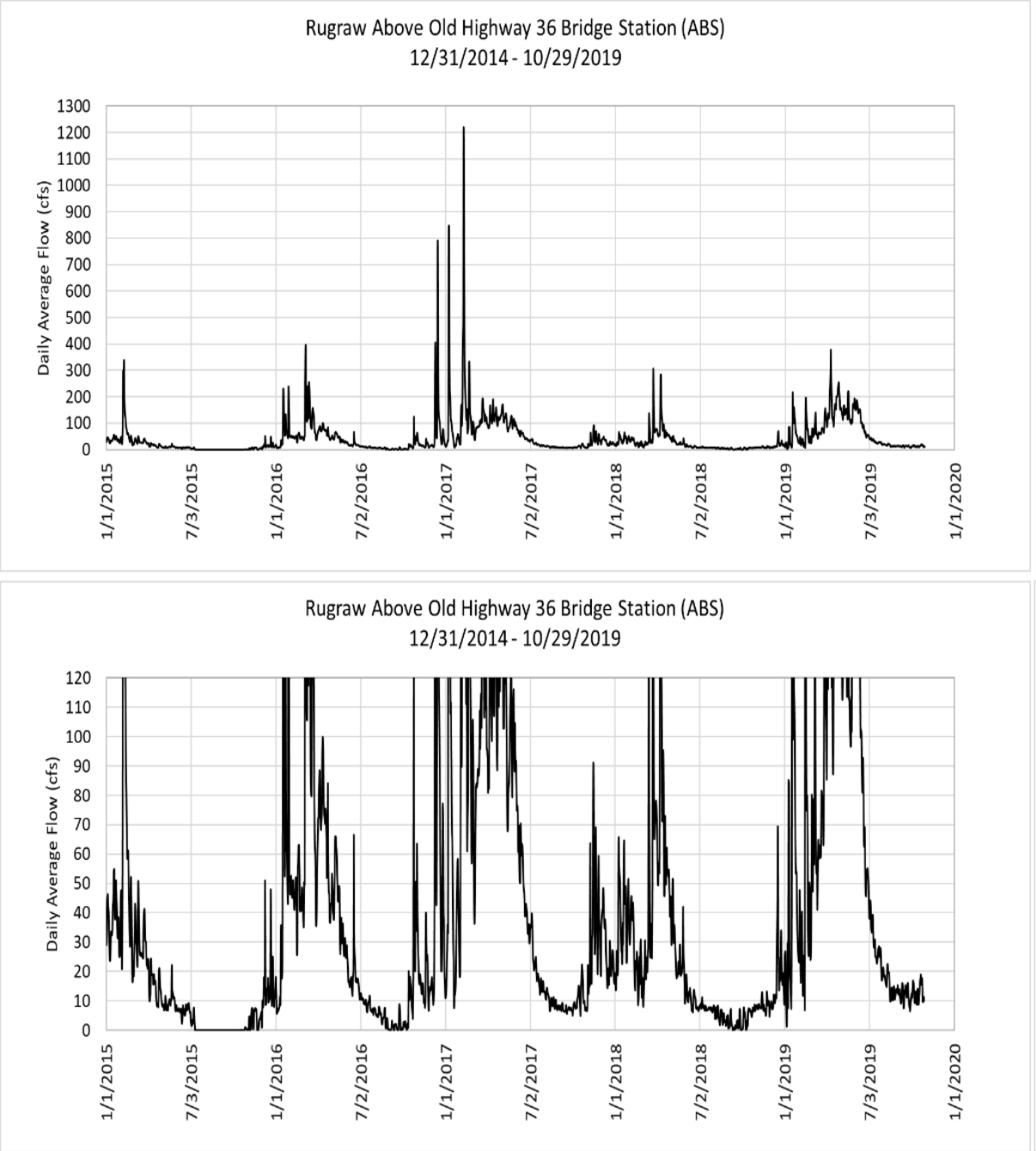


Figure 4.13–3. Time Series Hydrology for the South Fork Battle Creek Based on the Rugraw Above Old Highway 36 Bridge Station Empirical Data (ABS; 2015 – 2019) (note scale change in lower graph).

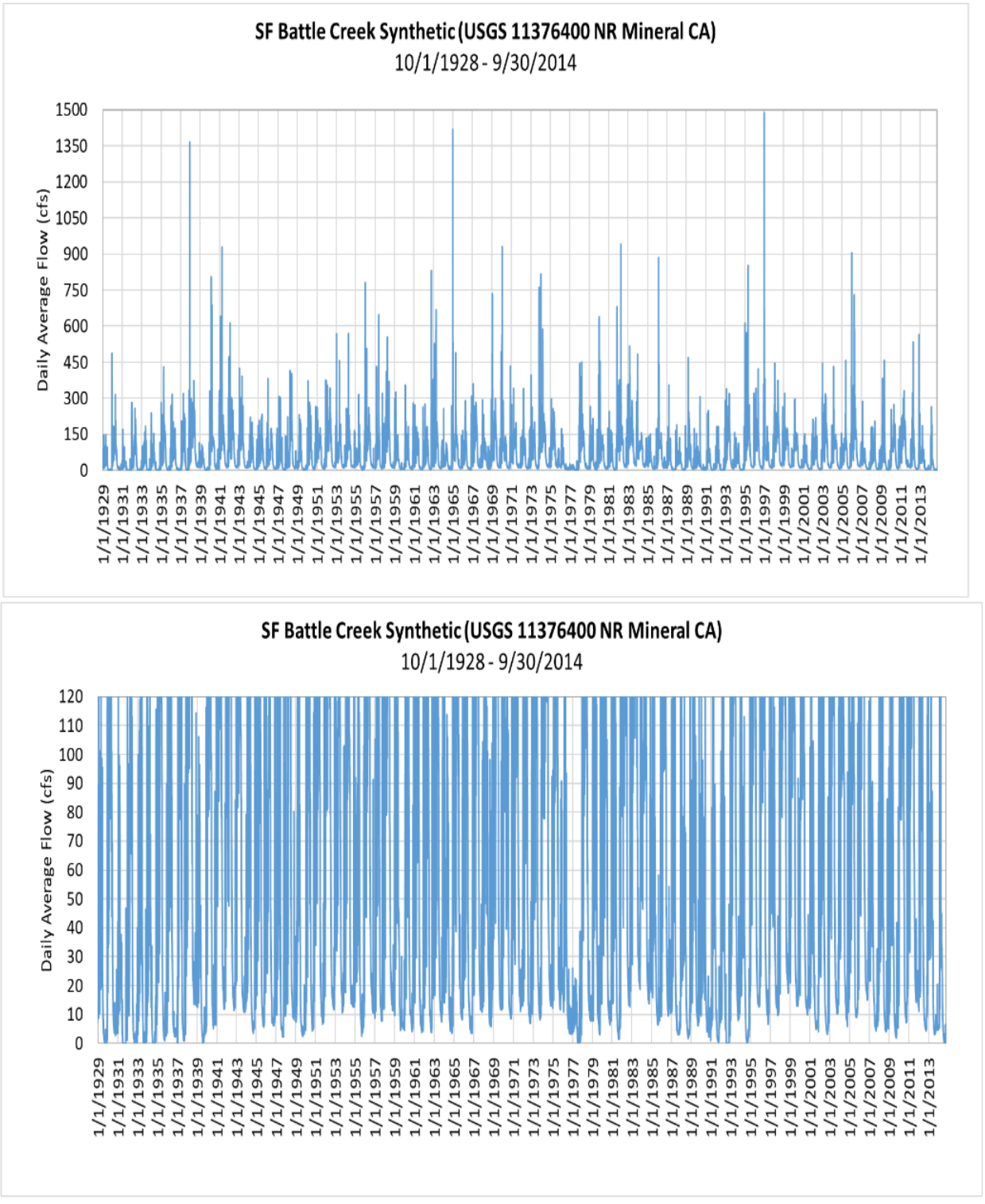


Figure 4.13–4. Time Series Hydrology for the South Fork Battle Creek Based on Synthetic Data (USGS 11376400 NR Mineral CA; 1929 – 2014) (note scale change in lower graph)

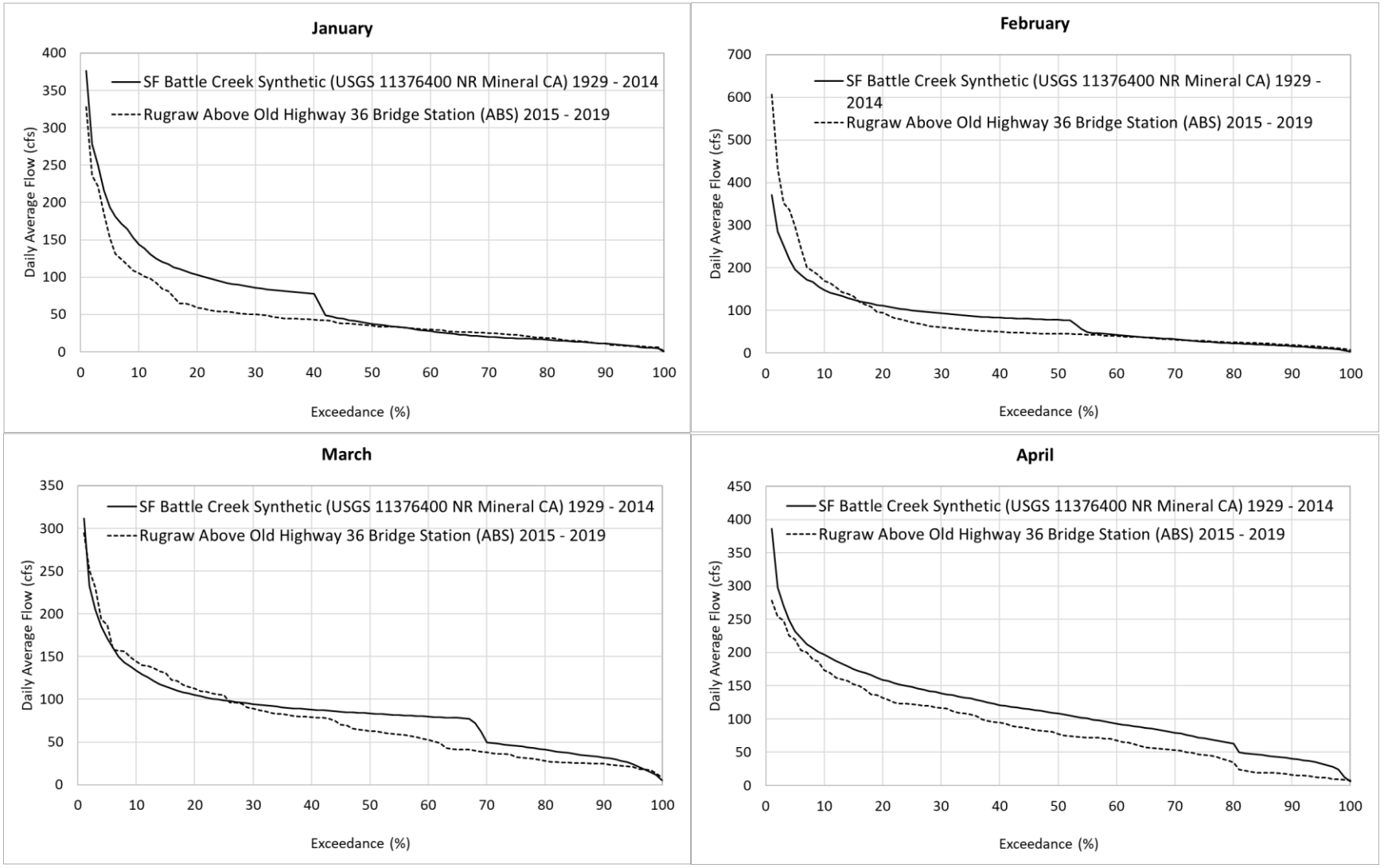


Figure 4.13–5. Exceedance Hydrology (January–April) for the South Fork Battle Creek Synthetic Data (USGS 11376400 NR Mineral CA; 1929 – 2014) and Rugraw Above Old Highway 36 Bridge Station Empirical Data (ABS; 2015 – 2019)

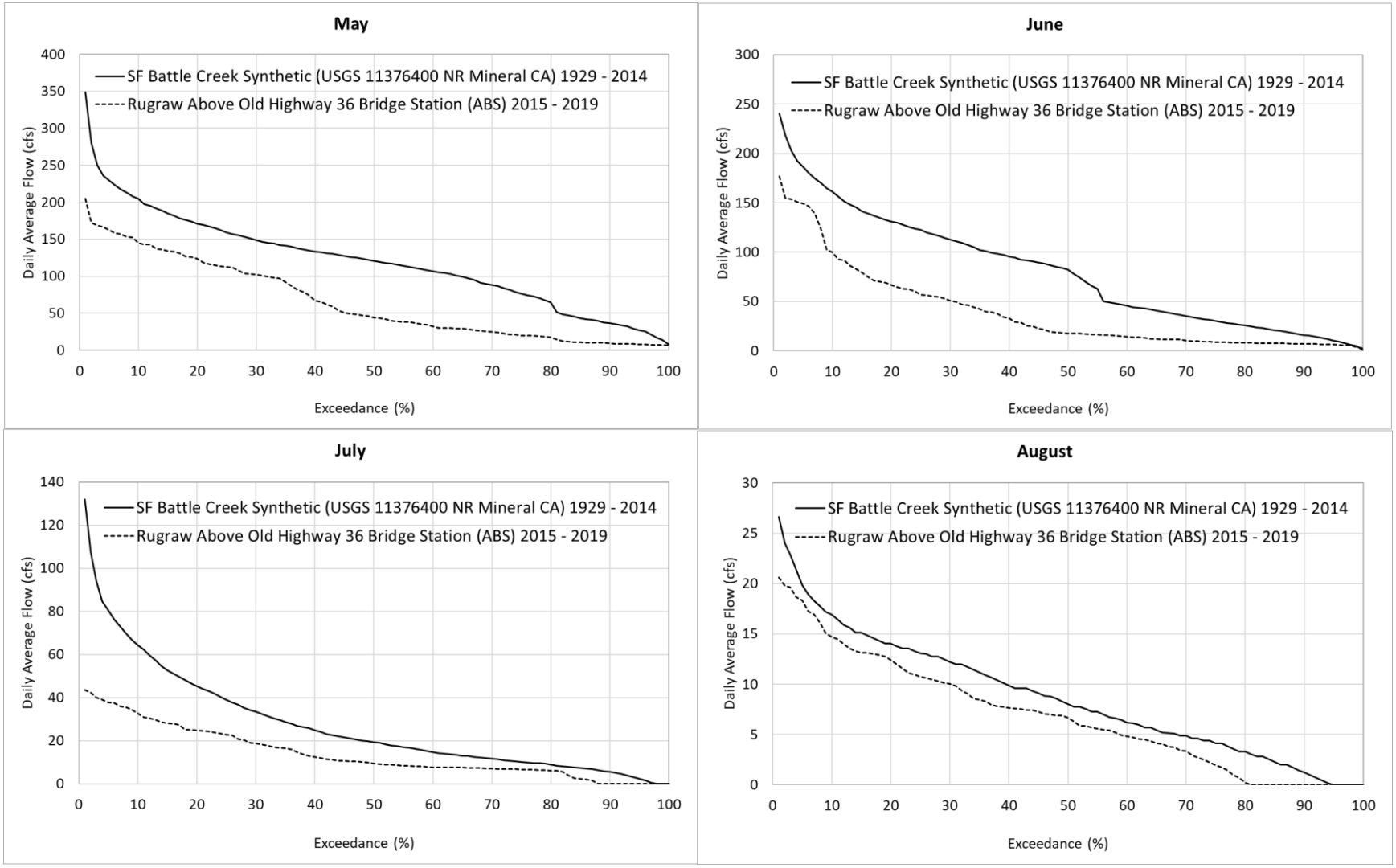


Figure 4.13–5 (Continued). Exceedance Hydrology (January–April) for the South Fork Battle Creek Synthetic Data (USGS 11376400 NR Mineral CA; 1929 – 2014) and Rugraw Above Old Highway 36 Bridge Station Empirical Data (ABS; 2015 – 2019)

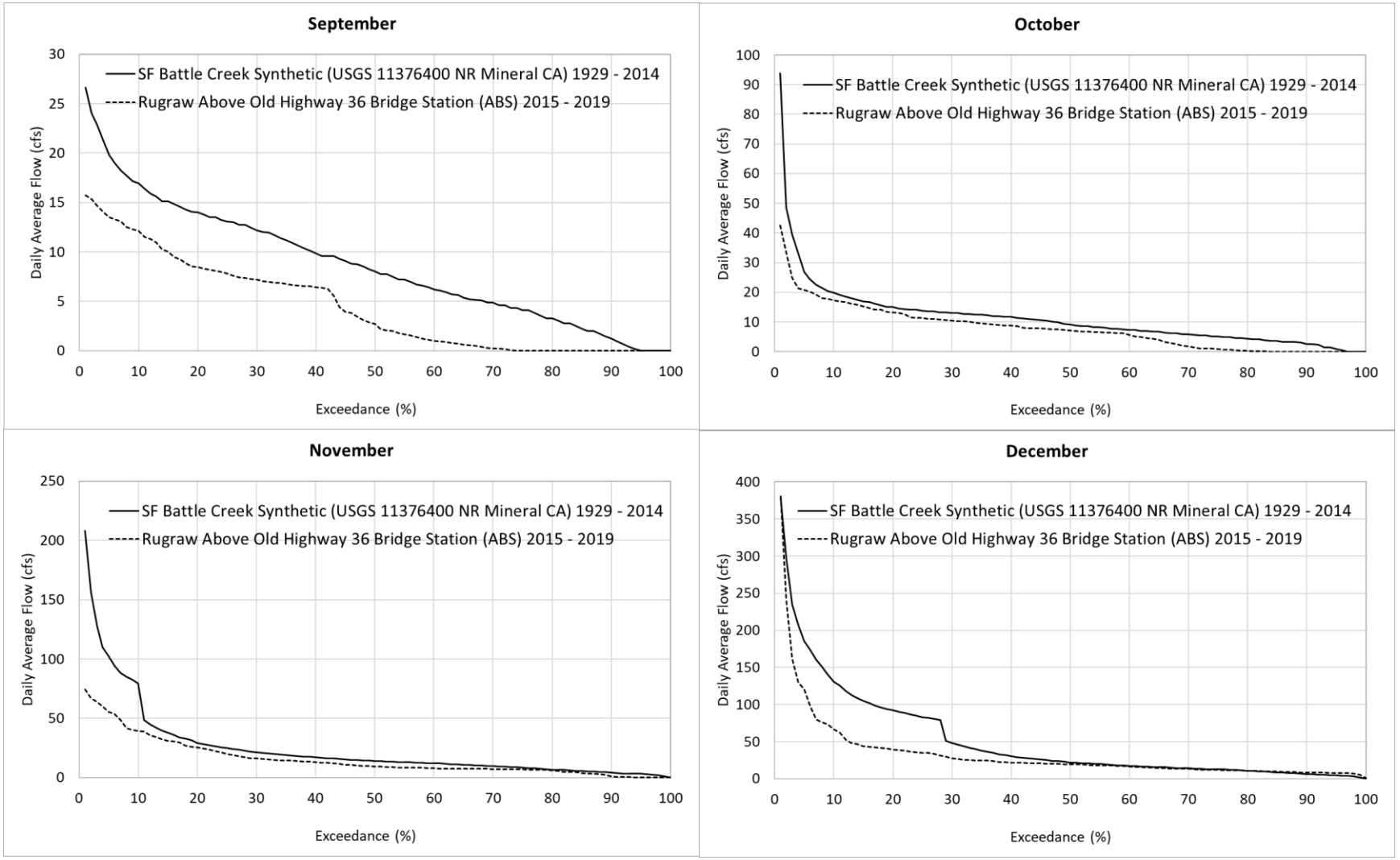


Figure 4.13–5 (Continued). Exceedance Hydrology (January–April) for the South Fork Battle Creek Synthetic Data (USGS 11376400 NR Mineral CA; 1929 – 2014) and Rugraw Above Old Highway 36 Bridge Station Empirical Data (ABS; 2015 – 2019)

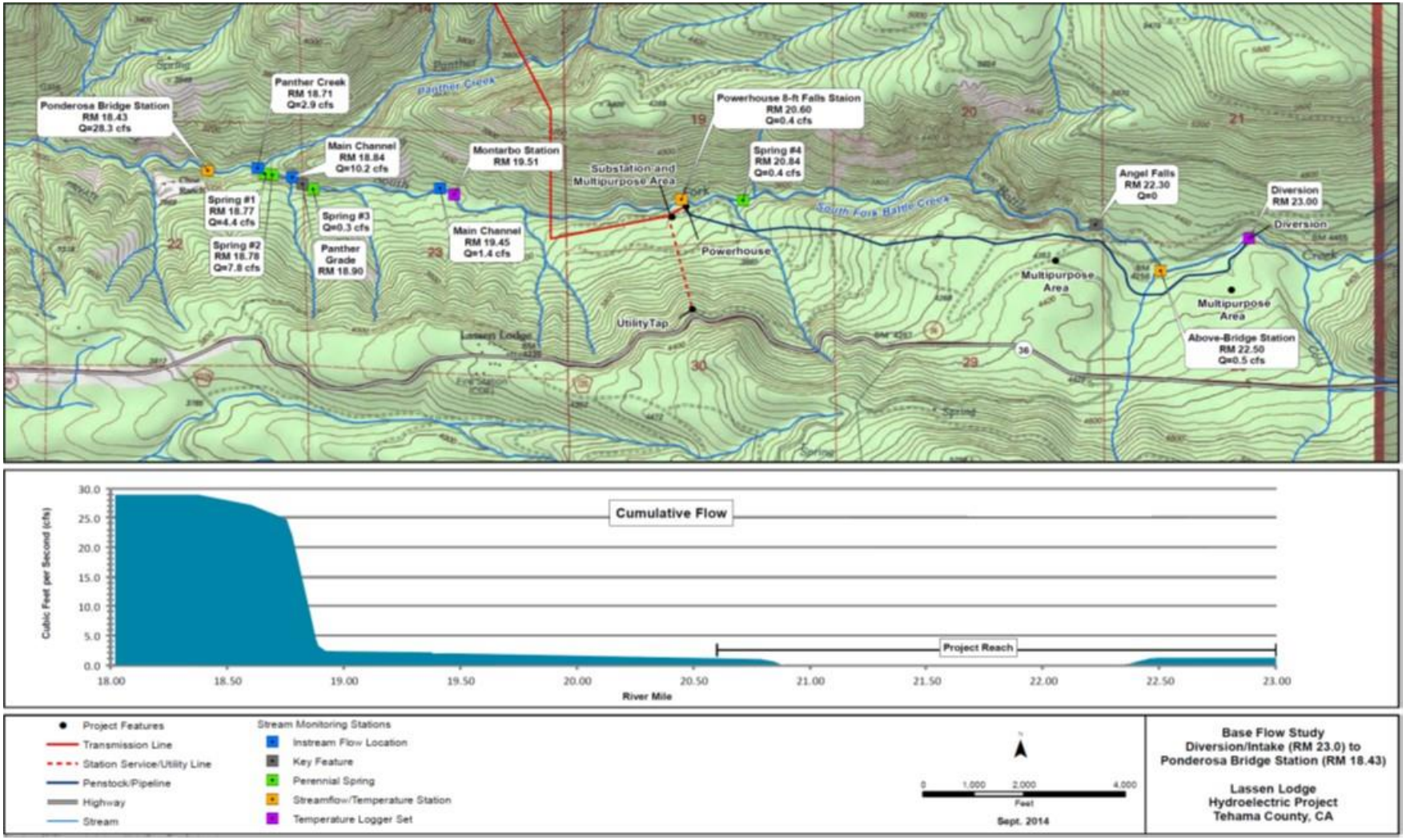


Figure 4.14–6. Baseflow Study November 1, 2014 (Source: Parkinson and Rugraw 2014)

4.13.1.3 Water Quality

The South Fork Battle Creek Basin is part of the Sacramento River Basin and the Central Valley Regional Water Quality Control Board's (CVRWQCB) Water Quality Control Plan for the Sacramento and San Joaquin River Basins (Basin Plan) (CVRWQCB, 2018). The Basin Plan designates the beneficial uses of water to be protected and the water quality objectives necessary to protect those uses. The Basin Plan specifies that the beneficial uses of any specifically identified water body generally apply to its tributary streams. Therefore, the beneficial uses identified for Battle Creek apply to the South Fork Battle Creek. The Basin Plan identifies the existing beneficial uses for Battle Creek as irrigation, stock watering, hydropower, water contact recreation, canoeing and rafting, other non–contact water recreation, warm freshwater habitat, cold freshwater habitat, coldwater aquatic organism migration, coldwater fish spawning, warmwater fish spawning, and wildlife habitat.

Water quality standards applicable to surface waters in the Proposed Project bypass reach are defined in two primary documents: the Basin Plan (CVRWQCB, 2018), and the California Toxics Rule (40 C.F.R. section 131.38) (CFR, 2020). Table 4.13–3 summarizes applicable water quality objectives for South Fork Battle Creek. No water bodies in the Proposed Project area were listed by the State Water Board as impaired in its most recent 303(d) list (State Water Board, 2014/2015).

Table 4.13–3. Water Quality Objectives for South Fork Battle Creek

Constituent	Water Quality Objectives
Temperature	Natural receiving water temperatures shall not be altered unless it can be demonstrated to the satisfaction of the Regional Board that such alteration does not adversely affect beneficial uses. At no time or place shall the temperature be increased more than 5°F above natural receiving water temperature.
Dissolved oxygen (DO)	Monthly median of mean daily DO concentration shall not fall below 85 percent of saturation in the main water mass, and the 95 percentile concentration shall not fall below 75 percent of saturation. DO concentrations shall not be reduced below 7.0 milligrams per liter (mg/l).
pH	The pH shall not be depressed below 6.5 nor raised above 8.5.
Turbidity	Water shall be free of changes in turbidity that cause nuisance or adversely affect beneficial uses. Increases in turbidity attributable to controllable water quality factors shall not exceed increases of 1 nephelometric turbidity unit (NTU) where natural turbidity is 0 to 5 NTU, increases of 20 percent where natural turbidity is 5 to 50 NTU, increases of 10 NTU where natural turbidity is 50 to 100 NTU, and increases of 10 percent where natural turbidity is greater than 100 NTU.
Fecal coliform	Based on a minimum of not less than five samples for any 30–day period, fecal coliform concentration shall not exceed a geometric mean of 200/100 milliliters, nor shall more than 10 percent of the total number of samples taken during any 30–day period exceed 400/100 milliliters.
Oil and grease	Waters shall not contain oils, greases, waxes, or other materials in concentrations that cause nuisance, result in a visible film or coating on the surface of the water or on objects in the water, or otherwise adversely affect beneficial uses.

Constituent	Water Quality Objectives
Sediment	The suspended sediment load and discharge rate shall not be altered in such a manner as to cause nuisance or adversely affect beneficial uses.
Settleable Material	Waters shall not contain substances in concentrations that result in the deposition of material that causes nuisance or adversely affects beneficial uses.
Suspended Material	Waters shall not contain suspended material in concentrations that cause nuisance or adversely affect beneficial uses.

Source: CVRWQCB, 2018

Upstream Water Quality

A review of available data and information shows that South Fork Battle Creek generally has excellent water quality (Tetra Tech, 2015a). Samples taken upstream near the Tehama County Sanitation District Number 1 ponds at Mineral suggest that overflow from these ponds may have historically caused elevated fecal coliform concentrations in the creek. No other point sources for pollutants upstream of the Proposed Project are known. Potential nonpoint sources include surface runoff from roads, exposed dirt surfaces, and cattle grazing pastures, which are most active during spring and summer.

Upstream of the project site is a large irrigated meadow with a wide, shallow channel configuration that likely impacts water temperature particularly in the low flow summer/fall season (see discussion below). Based on aerial photos, this area seems to have been fenced in the mid– to late–1990s, recovery of the channel and vegetation appears incomplete (Watercourse Engineering, 2015).

Bypass Reach Water Quality

Water quality sampling near the proposed diversion dam site and proposed powerhouse site conducted on September 4, 2013, during the critical low–flow period (streamflow of 4 to 5 cfs at the proposed diversion dam site) showed that the creek had low alkalinity (limited ability to neutralize acids), approximately neutral pH (neither acidic nor basic), and low electrical conductivity (low dissolved solids/ion concentration) (Table 4.13–4). These results are indicative of mountain stream surface water and limited groundwater inputs. Analyses for heavy metals at both sites did not reveal the presence of the eighteen regulated drinking water metals (Tetra Tech, 2015a). Dissolved oxygen was 7.7 mg/l and 6.3 mg/l, which was 90 percent and 66 percent of saturation at the proposed diversion and proposed powerhouse sites, respectively. During low flows, flow at the powerhouse site is primarily composed of groundwater from Spring Number 4. It is possible the low saturation dissolved oxygen could be from groundwater inflows. Surface water in this creek should typically be highly saturated. At a flow of 13 cfs, on July 3 and 4, 2013, dissolved oxygen measurements were 7.6 to 8.9 mg/L, or 86 to 89 percent of saturation (Sellheim and Cramer, 2013).

Table 4.13–4. South Fork Battle Creek Ambient Surface Water Quality Data, September 4, 2013

Constituent	Proposed Diversion Site	Proposed Powerhouse Location
Field Temperature (°C)	16.73	11.61
Field pH (units)	7.42	7.95
Field EC (µmhos/cm)	69	63
Field DO (mg/l)	7.66	6.27
Turbidity (units)	0	0
Total Alkalinity (mg/l)	32	39
Bicarbonate as CaCO3 (mg/l)	32	39
Carbonate as CaCO3 (mg/l)	ND (less than 5)	ND (less than 5)
Hydroxide (mg/l)	ND (less than 5)	ND (less than 5)
Chloride (mg/l)	0.56	0.89
Fluoride (mg/l)	ND (less than 0.10)	ND (less than 0.10)
Nitrate as NO3	ND (less than 2.0)	ND (less than 2.0)
Sulfate as SO4	5.1	2.3
Specific Conductance (µmhos/cm)	79	82
MBAS	ND (less than 0.10)	ND (less than 0.10)
Calcium (mg/l)	6.4	5.8
Magnesium (mg/l)	2.5	2.8
Potassium (mg/l)	1.3	1.3
Sodium (mg/l)	3.2	2.4
Hardness as CaCO3	26	26
pH (units)	7.51	7.57
Total Dissolved Solids (mg/l)	62	64
Mercury (µg/l)	ND (less than 1.0)	ND (less than 1.0)
Aluminum (µg/l)	ND (less than 50)	ND (less than 50)
Barium (µg/l)	ND (less than 100)	ND (less than 100)
Boron (µg/l)	ND (less than 100)	ND (less than 100)
Beryllium (µg/l)	ND (less than 1.0)	ND (less than 1.0)
Copper (µg/l)	ND (less than 50)	ND (less than 50)
Iron (µg/l)	ND (less than 100)	ND (less than 100)
Manganese (µg/l)	ND (less than 20)	ND (less than 20)
Zinc (µg/l)	ND (less than 50)	ND (less than 50)
Antimony (µg/l)	ND (less than 4.0)	ND (less than 4.0)

Constituent	Proposed Diversion Site	Proposed Powerhouse Location
Arsenic (µg/l)	ND (less than 2.0)	ND (less than 2.0)
Cadmium (µg/l)	ND (less than 1.0)	ND (less than 1.0)
Chromium (µg/l)	ND (less than 10)	ND (less than 10)
Lead (µg/l)	ND (less than 5.0)	ND (less than 5.0)
Nickel (µg/l)	ND (less than 10)	ND (less than 10)
Selenium (µg/l)	ND (less than 5.0)	ND (less than 5.0)
Silver (µg/l)	ND (less than 10)	ND (less than 10)
Vanadium (µg/l)	ND (less than 3.0)	ND (less than 3.0)
Thallium (µg/l)	ND (less than 1.0)	ND (less than 1.0)

Source: Tetra Tech, 2015a
Notes: °C – degrees Celsius
µg/L – microgram per liter
µmhos/cm – micromhos per centimeter
mg/l – milligrams per liter
ND – no detection.

4.13.1.4 Water Temperature

Rugraw collected water temperature data in multiple years, 2003–2006 and 2013–2019, (partial data in some years) for Proposed Project planning purposes (refer to Section *4.7, Biological Resources – Aquatics and Fisheries*, Figures 4.6–6 through 4.6–10). Data collected near the proposed diversion dam site from November 2003 through December 2006 showed daily mean temperatures that ranged from near freezing in the winter to a maximum of about 18°C (64°F) in late summer (Tetra Tech, 2015a) (Figure 4.6–7, top plot).

Peak temperatures correlate with the seasonal low flow regime in the creek, particularly at the upstream sampling site. For example, in late summer of drought years (e.g., 2014 and 2015), the water temperature at the ABS site (RM 22.5) was greater than 20°C and had large diel (daily) temperature fluctuations (typically greater than 5°C), while the downstream powerhouse site (RM 20.6, in the narrow canyon) had cooler water temperature (15–16°C) and a smaller diel temperature fluctuation (typically 2–3°C) (likely from canyon shading and groundwater inflow, discussed below) (Figures 4.6–7 and 4.6–8).

During fall 2014, the middle of the Proposed Project bypass reach was dry due to natural low flows (Figure 4.6–6). Spring flow from Spring Number 4 just upstream of the proposed powerhouse reestablished the flow and was the source of the cooler water at the powerhouse site. Springs farther downstream of the powerhouse greatly increased the flow (see Figure 4.6–6) and decreased the water temperature (Figure 4.6–7, middle and bottom plots). Similar summer warm conditions at the ABS and cooler conditions at temperature monitoring sites upstream of Spring Number 4 occurred in early summer of 2015 (another drought year) (Figure 4.6–8).

Water temperature data from 2015 through 2019 show that summer average daily water temperatures below 20°C occur in higher flow years (2016, 2017 and 2019) (Figures 4.6–4 and 4.6–9) and when flows are above approximately 10 cfs (Figures 4.6–9 and 4.6–10).

As discussed in Section 2.3.2, the Proposed Project would not begin operation until flows reach 18 cfs. When there was more flow in the Proposed Project bypass reach during the late summer/early fall (approximately 7 cfs or more, see Figure 4.6–4), the average daily water temperature at the ABS and powerhouse sites were nearly identical, but as mentioned previously, the powerhouse site had less diel fluctuation (Figure 4.6–9). Data also shows that during the winter and spring the water temperature at the powerhouse site was slightly warmer than the ABS site (Figure 4.6–9).

Approximately two miles upstream of the proposed diversion dam site, the creek flows through a large, open meadow with minimal riparian shading, which can result in both summer warming and winter cooling of the water at the upstream ABS site. Within the Proposed Project area, the canyon is narrow and incised with less solar exposure, which can cool the stream in the summer and warm the stream in the winter. In addition, Spring Number 4 upstream of the proposed powerhouse provides groundwater inflow. Both factors can stabilize summer and winter water temperatures in the downstream portion of the Proposed Project bypass reach.

4.13.1.5 Benthic Macroinvertebrates Analysis

Benthic macroinvertebrates (BMI) are aquatic insects that live a portion of their life in the stream and are the primary food source for resident fish and other aquatic organisms. The primary objective of BMI monitoring is to provide biological indicators of aquatic habitat health and functionality to be used in conjunction with water quality and substrate data to evaluate potential project effects on aquatic habitat. Because water quality requirements for the various BMI taxa are well known, BMI monitoring can complement traditional physical and chemical measurements to assess water quality conditions.

Baseline BMI data for the Proposed Project were reported by ECORP (2010). The original BMI sampling was conducted in September 2003 by North State Resources, following a prescribed Benthic Macroinvertebrate Study Plan using the California Stream Bioassessment Protocol (CSBP) developed by the California Department of Fish and Wildlife (CDFW) (2002). ECORP (2010) processed and analyzed the samples using the CSBP methods. CSBP was a precursor to the current Surface Water Ambient Monitoring Program (SWAMP) (sampling approach and data processing are modified). The BMI sampling plan focused on examining stream benthos in the following reaches:

- Upstream of the proposed diversion;
- Immediately downstream of the proposed powerhouse;
- Within the bypass reach above Angel Falls; and
- Within the bypass reach below Angel Falls.

The State Water Board, CDFW, and National Marine Fisheries Service (NMFS) requested a BMI bioassessment be conducted in support of Rugraw's License Application. Both the State Water Board and CDFW requested that the California Stream Bioassessment Protocol (CSBP) be used for this study, which was the preferred rapid bioassessment protocol at the time (2003). The State Water Board and CDFW were also interested in a baseline index of existing water quality and habitat conditions, as reflected by the quality of the BMI community. It was the consensus of the agency/stakeholder group meeting on November 20, 2007, to proceed with the samples previously collected using the CSBP protocol.

Based on a review of Google Earth historical imagery from 2003 to present, it appears there has been limited change in development of the watershed upstream of the Proposed Project since the CSBP samples were collected; therefore, the 2003 sampling should be representative of current conditions. The stream channel and riparian vegetation in the large irrigated meadow upstream of the Proposed Project appears to have gradually improved since fencing in 1990's. Timber harvest plots in the upper watershed have regrown, while some new timber harvest plots have occurred in the lower portion of the watershed, but no major changes have occurred.

Overall, the BMI data collected in September 2003 indicate that the portion of South Fork Battle Creek within the Proposed Project bypass reach has a healthy aquatic system. The results indicate a robust benthic community, consisting primarily of diverse and abundant intolerant taxa (i.e., BMI that are sensitive to decreased or poor water quality) with very few (less than 2 percent of the sample for all sites) tolerant species (i.e., BMI that can tolerate poor water quality). To evaluate the overall condition of the South Fork Battle Creek benthic community relative to other west slope Sierra Nevada streams, the Index of Biological Integrity (IBI) score for South Fork Battle Creek (based on the 2003 CSBP data) was compared with the IBI score for the combined west slope Sierra Nevada hydroelectric project data. The IBI was developed by CDFW using data from various monitoring programs associated with hydroelectric projects throughout the west slope of the Sierra Nevada Mountains (Rehn 2008) and utilizes BMI data to assess biological conditions in streams related to hydropower projects. The South Fork Battle Creek IBI score was generally among the highest scores43 in the region.

4.13.1.6 Flood Hazards

The Proposed Project area is located in a zone identified by the Federal Emergency Management Agency (FEMA) as a zone with minimal flood hazards (FEMA, 2019a). FEMA labels areas of minimal flood hazard as Zone X, which indicates minimal risk areas with elevations typically outside the 500–year floodplain (FEMA 2020b).

4.13.1.7 Groundwater

Domestic water supply facilities, consisting primarily of groundwater wells, lie along the upper reaches of the stream near Mineral, CA, upstream of the Proposed Project. There are no other water users, domestic or otherwise, within the Proposed Project area. Surface water flows in South Fork Battle Creek are augmented by large springs, particularly downstream of the Proposed Project powerhouse. Streamflows are addressed above in Section 4.13.1.2, Hydrology.

4.13.2 Regulatory Setting

This section discusses policies and regulations relevant to the analysis of hydrology and water quality in the Proposed Project area.

[43] A higher IBI score indicates a healthier aquatic system.

4.13.2.1 Federal Clean Water Act

The Clean Water Act (CWA), initially passed in 1972, regulates the discharge of pollutants into watersheds throughout the nation. Through cooperative federalism, responsibility for setting standards and issuing and enforcing permits is shared by the EPA, United States Army Corps of Engineers (USACE), states, and authorized tribes.

Under the CWA, NPDES permits are required for discharges of pollutants to navigable waters of the United States. These include any discharge to surface waters, such as lakes, rivers, streams, bays, the ocean, dry stream beds, wetlands, and storm sewers that are tributary to any surface water body. NPDES permits are issued under section 402 of the CWA. (33 U.S.C. § 1342.)

Section 303

As illustrated in Section 4.13.1.3, the State of California adopts water quality standards to protect beneficial uses of state waters, as required by section 303 of the CWA (33 U.S.C. § 1313.) Section 303(d) of the CWA requires states and authorized tribes to list impaired water bodies (i.e., water bodies that do not meet water quality standards) and establish corresponding Total Maximum Daily Loads for these impaired water bodies. However, there are no Section 303(d) listed water bodies in the vicinity of the Proposed Project.

Section 401

As discussed in Section 1.2, section 401 of the CWA (33 U.S.C. § 1341) requires applicants for a federal license or permit that may result in a discharge into navigable waters to provide the federal licensing or permitting agency a certification from the applicable state agency that the activity to be licensed or permitted will comply with federal and state water quality standards. A federal agency may not issue a license or permit without a certification or waiver from the state or authorized tribe where the discharge originates.

In California, the State Water Board is the state agency with regulatory authority to issue or deny water quality certifications for hydroelectric projects licensed by FERC. The conditions of a certification issued by the State Water Board become mandatory conditions in the FERC license for the Proposed Project.

Section 404

Section 404 of the CWA (33 U.S.C. § 1344) establishes a program to regulate the discharge of dredged or fill material into waters of the United States, including wetlands. Activities in waters of the United States regulated under this program include fill for development, water resource projects (such as dams and levees), infrastructure development (such as highways and airports), and mining projects. Section 404 requires that a permit be issued before dredged or fill material may be discharged into waters of the United States, unless the activity is exempt from section 404 regulation (e.g., certain farming and forestry activities).

4.13.2.2 State of California

Porter–Cologne Water Quality Control Act

California's primary statute governing water quality and water pollution issues with respect to both surface waters and groundwater is the Porter–Cologne Water Quality Control Act of 1970 (Porter–Cologne Act, Wat. Code, § 13000 et seq.). The Porter–Cologne Act grants the State Water Board and each of the nine Regional Water Quality Control Boards (RWQCB) authority to protect water quality and is the primary vehicle for implementation of California's responsibilities under the CWA. This act grants the State Water Board and the RWQCBs authority and responsibility to adopt plans and policies, regulate discharges to surface and groundwater, regulate waste disposal sites, and require cleanup of discharges of hazardous materials and other pollutants. The Porter–Cologne Act also establishes reporting requirements for unintended discharges of any hazardous substances, sewage, or oil or petroleum products. The State Water Board and the RWQCBs jointly administer federal and state laws related to water quality in coordination with the EPA and USACE (State Water Board, 2019).

Basin Plan

The Water Quality Control Plan for the Sacramento and San Joaquin River Basins (Basin Plan) establishes water quality standards for all the ground and surface waters of the region. As discussed in Section 4.13.1.3, the Basin Plan designates the beneficial uses of water and water quality objectives needed to protect the identified beneficial uses. Thus the term "water quality standards" encompasses both the beneficial uses of specific water bodies and the levels of quality that must be met and maintained to protect those uses. The South Fork Battle Creek Basin is part of the Sacramento River Basin and is therefore overseen by the CVRWQCB. The water quality objectives Basin Plan designated by the Basin Plan applicable to surface waters in the Proposed Project area are shown in Table 4.13–3.

Stormwater Discharges

In 1992, the State Water Board adopted a General Construction Storm Water Permit,[44] which requires landowners to file a Notice of Intent to discharge stormwater runoff to waters of the United States from land disturbances greater than 5 acres. In March 2003, the land disturbance threshold was reduced to 1 acre. The permit generally requires dischargers to develop and implement a Storm Water Pollution Prevention Plan (SWPPP) and perform inspections of stormwater pollution prevention measures (State Water Board, 2010).

Groundwater Management Act (AB 3030)

The Groundwater Management Act, first enacted in 1992 as Assembly Bill 3030 (AB 3030), established specific procedures for local agencies to develop and adopt Groundwater Management Plans (GWMPs). The intent of the Groundwater Management Act is to encourage local agencies to

[44] *National Pollutant Discharge Elimination System (NPDES) General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities.* Water Quality Order Number 2009–0009–DWQ and NPDES Number CAS000002, as amended by Order Number 2010–0014–DWQ, Order Number 2012–0006–DWQ.

work cooperatively to manage groundwater resources within their jurisdictions and provide a methodology for developing GWMPs (DWR, 2020).

Sustainable Groundwater Management Act

On September 16, 2014, Governor Brown signed into law a package of bills (SB1168, AB1739, and SB1319) collectively called the Sustainable Groundwater Management Act (SGMA). SGMA requires local public agencies and Groundwater Sustainability Agencies (GSAs) in high– and medium–priority basins to develop and implement Groundwater Sustainability Plans (GSPs) or Alternatives to GSPs. GSPs are detailed road maps for how groundwater basins will reach long–term sustainability. Low or very low priority basins are not subject to SGMA but are encouraged to form GSAs and GSPs, update existing groundwater management plans, and coordinate with adjacent basins to develop a new groundwater management plan (DWR, 2020). According to the California Department of Water Resources' (DWR) SGMA 2019 Basin Prioritization and as shown in Figure 4.13–4, South Battle Creek Basin (Basin Number 5–006.06) is very low priority (DWR, 2019). Therefore, the groundwater basin in the vicinity of the Proposed Project is not subject to SGMA, but may form GSAs and develop GSPs as encouraged by SGMA.

4.13.2.3 Local

Tehama County General Plan

The Tehama County General Plan (Tehama, 2009) includes the following objectives and policies related to water quality:

- *GOAL OS–1:* To ensure that water supplies of sufficient quality and quantity will be available to serve the needs of the Tehama County, now and into the future.
  - *Policy OS–1.1:* The County shall protect and conserve water resources and supply systems through sound watershed management.
    - *Implementation Measure OS–1.1c:* Ensure that projects adhere to the regulations of the State of California Reclamation Board, California Department of Fish and Game, Regional Water Quality Control Board, and US Government.
    - *Implementation Measure OS–1.1e:* Continue to maintain and implement the Adopted AB 3030 Groundwater Management Plan (GWMP) to protect and preserve water supplies and water quality.
  - *Policy OS–1.3:* Surface water quality and stream flows for water supply, water recharge, recreation, and aquatic ecosystem maintenance shall be protected while respecting adjudicated and appropriated (California recognized water rights) rights of use.
- *GOAL LU–10:* To promote development patterns that recognize the need to preserve water resources, consistent with other stated goals.
  - *Policy LU–10.1:* The County shall actively promote the implementation of the County's Groundwater Management Plan (GWMP).
    - *Implementation Measure 10.1a:* Implement the recommended management and monitoring actions of the GWMP and identify and quantify the water production, water quality, and groundwater recharge activities occurring within the County.

- *GOAL ED–7:* Protect and enhance environmentally sensitive lands and natural resources while, at the same time, promoting business expansion, retention and recruitment.
  - *Policy ED–7.1:* The County shall continue to preserve Tehama County's natural resources including: agriculture, timberlands, water and water quality

Coordinated AB 3030 Groundwater Management Plan 2012

The Tehama County Flood Control and Water Conservation District adopted a Coordinated AB 3030 Groundwater Management Plan (GWMP) in November 1996. This GWMP was updated in 2012 by the coordinated efforts of the University of California Cooperative Extension, the Tehama County AB 3030 Technical Advisory Committee (TAC) and the Department of Water Resources, Northern Region.

The primary purpose of the GWMP is to sustain groundwater levels that balance long–term extraction and replenishment and ensure sufficient groundwater supplies of usable quality are maintained for reliable, efficient, and cost–effective extraction (Tehama, 2012).

Tehama County Groundwater Sustainability Agency Groundwater Commission. The Tehama County Groundwater Sustainability Agency Groundwater Commission has both decision–making and advisory responsibilities for eleven subbasins within Tehama County.[45] This commission is in the process of developing a GSP before the January 31, 2022, deadline (Tehama, 2020).

[45] The Tehama County Flood Control and Water Conservation District was designated as the GSA for eleven subbasins within Tehama County under SGMA. In 2016, this district established the Tehama County Groundwater Sustainability Agency Groundwater Commission, giving it decision–making and advisory responsibilities for all eleven subbasins.

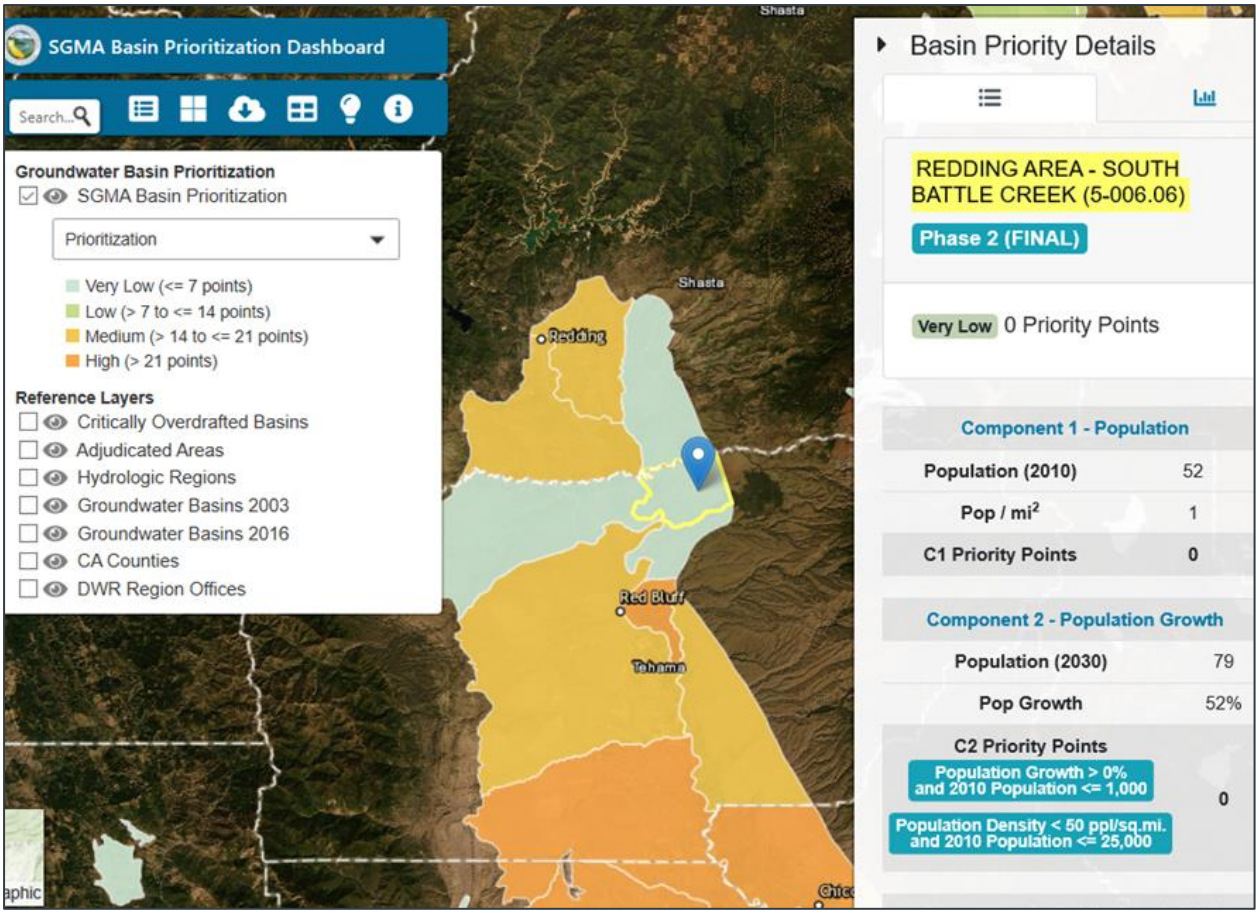


Figure 4.13–4. DWR 2019 SGMA Basin Prioritization Dashboard Showing South Fork Battle Creek Basin as Very Low Priority

4.13.3 Analysis Methodology

Analysis of the Proposed Project's impacts on hydrology and water quality is based on the review of the Proposed Project design, technical reports in Rugraw's Final License Application, and analysis in the FERC EIS (FERC 2018). The area of assessment includes the Battle Creek watershed. Impacts on surface and groundwater quality were analyzed by reviewing existing groundwater and surface water data and information pertaining to the Proposed Project area, evaluating water quality reports for the Proposed Project area, and determining potential sources of water quality impacts based on Proposed Project construction, operation, and maintenance activities. The analysis also includes consideration of applicable policies, plans, and programs. Impacts on water temperature and instream flows are discussed in *Section 4.6, Biological Resources – Aquatics and Fisheries*.

4.13.3.1 Criteria for Determining Significance

Based on Appendix G of the 2020 CEQA Guidelines, an impact on hydrology or water quality would occur if the Proposed Project would:

- Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality;

- Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin;
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:
  - Result in substantial on– or offsite erosion or siltation;
  - Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on– or offsite;
  - 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; or
  - Impede or redirect flood flows;
- In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation; or
- Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan.

4.13.4 Applicant–Proposed Measures

As discussed in *Section 2.3.4,* Rugraw has proposed Biological Resources Protection Measures. In addition, as also discussed in *Section 2.3.4*, Rugraw has proposed general construction measures and is required to implement the Environmental Management and Monitoring Plans summarized below.

4.13.4.1 General Construction Measures

1. Develop a construction plan to be filed for FERC approval prior to the start of ground–disturbing activities. This construction plan should also be closely coordinated with the Stormwater Pollution Prevention Plan (SWPPP).
2. Limit land disturbance and vegetation clearing to those areas needed for construction. Delineate the limits of construction, work areas, and multipurpose areas with flagging, fencing, and/or stakes to prevent land–disturbing activities outside of construction areas.
3. Stockpile natural topsoils and replace, regrade, and revegetate disturbed areas, in accordance with California forestry regulations and best practices, with native vegetation. Restore disturbed stream and riparian habitat to pre–construction conditions and with riparian plantings and/or seeding, where applicable, with seed mixes recommended by CDFW.
4. Develop a SWPPP with measures to prevent storm–induced erosion and sedimentation during ground–disturbing construction activities, including:

a. Store spoils from Proposed Project construction in areas that limit erosion of spoil material and prevent runoff into aquatic habitats.

b. Install cofferdams, silt fences, or other structures to isolate in–water work areas and only use washed riprap, rocks, and gravel adjacent to or in watercourses (see below for additional SWPPP components).

5. Use existing roads to the maximum possible extent, constructing new access roads only when necessary; limit access roads to a width of 12 feet whenever possible; and surface permanent roads with gravel to a depth and quantity sufficient to maintain a stable road surface and minimize erosion and dust.

6. Conduct in–water work activities between July 1 and October 15 when streamflows are low to protect water quality and aquatic resources.

4.13.4.2 Biological Resource Measure

Along with a variety of biological related protections, this measure states that Rugraw will avoid streams, wetlands, and pond habitats to the extent possible during construction, and use existing stream and wetland crossings where possible."

4.13.4.3 Environmental Management and Monitoring Plans

Debris and Sediment Management Plan

The Proposed Project includes a Debris and Sediment Management Plan (DSMP) that will include:

- Annual sluicing of sediments from the Proposed Project's reservoir when natural flow at the diversion site exceeds 418 cfs or in years where natural flows never reach 418 cfs, the sediment deposits in the reservoir would be evaluated to determine if sluicing is needed;
- Consultation with the State Water Board and CDFW to determine if the sluicing of sediments should occur when flows are less than 418 cfs;
- Monitoring of turbidity associated with sluicing events to document any project–caused exceedance of the Central Valley Regional Water Quality Control Board Basin Plan's turbidity objectives;
- Periodic surveys of the Proposed Project impoundment to document sediment and woody material deposition; and
- Process to modify the DSMP as needed.

Chapter 2 also includes a description of sediment and sluicing management, as well as woody debris management (*Section 2.3.3.8, Routine Facility Inspections, Testing, and Maintenance*).

Turbidity and pH Monitoring Plan

A Turbidity and pH Monitoring Plan would be developed to document and report to the Resource Agencies observations of oily sheens and turbidity plumes during Proposed Project construction.

Erosion Control and Sedimentation

Rugraw proposes to develop a SWPPP that outlines measures to prevent erosion and sedimentation during Proposed Project construction. The SWPPP would include, at a minimum, provisions to:

- Limit surface disturbance to only those areas necessary for construction, thereby preserving existing vegetation;
- Salvage and stockpile topsoil and following construction, replace, regrade and seed topsoil with native vegetation;
- Use temporary fencing and protective barriers to protect vegetation not required to be removed;
- Initiate construction immediately following vegetation clearing to minimize the exposure of disturbed areas to wind and water erosion;
- Slope roadways and excavations away from washes and clear loose soils and sediments in areas where haul roads would cross surface washes;
- Install washed riprap at the washes;
- Build small earthen embankments within washes to slow or divert surface water;
- Install silt fences in work areas near a wash to prevent sediment from entering the wash during rain storms; and
- Apply water to disturbed soil areas to ensure excessive runoff does not occur and to control wind erosion and dust.

Rugraw will also utilize cofferdams and other structures to isolate in–water work areas and allow for construction "in the dry." Other proposed BMPs include installation of sedimentation basins for capturing solids in stormwater runoff; placement of construction materials to avoid erosion from flowing water, and construction of permanent roads with gravel depth and quantity to maintain a stable road surface.

4.13.5 Environmental Impacts and Mitigation

4.13.5.1 Impacts Related to Violation of Water Quality Standards or Waste Discharge Requirements or Degrade Surface or Groundwater Quality

IMPACT 4.13–1: Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality?

As shown in Table 4.13–3, water quality objectives applicable to South Fork Battle Creek include temperature, dissolved oxygen, pH, turbidity, fecal coliform, oil and grease, sediment, settleable materials, and suspended materials. Proposed Project operational impacts on temperature are discussed in *Section 4.6.6.1 Impacts to Special–status Species or Their Habitats*. Potential construction impacts to water temperature are discussed here.

Construction

Proposed Project construction activities include the mobilization of construction equipment, personnel, and staging materials for clearing, excavation, grading, and surface preparation.

Construction of new roads, upgrading existing roads, and the storage of potentially hazardous materials would also occur. Construction of facilities would include instream work for the construction of the diversion/intake structure and tailrace, concrete pouring related to diversion dam/fish screen construction and powerhouse construction, and earthmoving and grading associated with the construction of the pipeline, penstock, powerhouse, substation, transmission and powerlines, and switchyard. These construction activities could result in an exceedance of the water quality objectives listed in Table 4.13–3 and could negatively impact the beneficial uses of South Fork Battle Creek, thereby violating the water quality standards.

The mobilization of equipment and personnel and the use of the equipment would require the use of construction vehicles, as well as the storage of hazardous materials such as fuel and oil service vehicles. An accidental spill could degrade groundwater and surface water quality and exceed turbidity, pH, and oil and grease standards. As shown in Table 4.13–3, the Basin Plan provides that pH shall not be depressed below 6.5 nor raised above 8.5, turbidity changes shall not cause nuisance or exceed the applicable range depending on the natural value, and oil and grease should not be contained in waters at a concentration that cause nuisance or result in a visible film or coating on the surface of the water or on objects in the water. Depending on the size and potency of the spill, these objectives could be exceeded. To minimize the potential of a spill, Rugraw proposed to develop and implement a Turbidity and pH Monitoring Plan which would require documenting and reporting observations of oily sheens and turbidity plumes during construction to Resource Agencies. The Turbidity and pH Monitoring Plan would also include appropriate measures to address oily sheens and turbidity plumes if adverse effects are discovered. The plan, however, does not include details related to other water quality criteria or monitoring. Similarly, the Proposed Project includes a general construction measure that requires development of a SWPPP that would include measures to prevent storm–water erosion and sedimentation during construction. The SWPPP would include provisions for using cofferdams, silt fences, limiting vegetation removal, installing energy dissipaters and other structures to isolate in–water work areas. The proposed construction plan and other proposed measures and plans do not, however, specifically address compliance and monitoring for increases in turbidity, suspended sediment, settleable material, pH, or dissolved oxygen amounts that could directly affect organisms. Similarly, the proposed plans and measures do not identify stop–work or remedial methods for addressing identified water quality problems, nor do they identify best management practices (BMPs) to prevent hazardous material spills (oil, fuel, others).

The Proposed Project would construct two new roads that branch off existing access roads within the southeastern portion of the Proposed Project area and south of South Fork Battle Creek. One new road approximately 350 feet in length and 20 feet in width would be constructed to the powerhouse from road 120A7 and contain an 8–inch gravel base. Approximately 3,500 feet of 120A7 would be graded and resurfaced with gravel. The second new road would be an extension of the existing road 100A, approximately 2,000 feet in length by 20 feet in width that would also contain an 8–inch gravel base.

Construction activities, including road and general construction, can cause dust, localized erosion, sedimentation, and increased runoff. As a result, gravel, sediment, vegetation, and oxygen–demanding organic soil could enter the surface water and adversely impact water quality. For example, runoff could directly interfere with the soil–water interface and disturb bottom sediments, resulting in increased turbidity and potentially exceeding water quality

objectives. Rugraw has agreed to implement the General Construction and Erosion Control and Sedimentation Measures described above, which would prevent or lessen water quality impacts. These measures are expected to prevent road and general construction activities from exceeding water quality objectives.

The Proposed Project would also include in–water and near–water construction activities, including the construction of the diversion dam, intake, and control/fish screen structure concrete foundation and floor slab installations. The diversion dam would be a buttressed concrete stem wall structure placed in the streambed. The intake structure would be an enclosed concrete structure located outside the normal high water mark on the south bank of the stream, and the fish screen would consist of concrete footing and floor area along with stainless steel perforated plate panel screens. The instream construction of these facilities would temporarily disturb the streambed, which could temporarily increase turbidity due to the increase in sedimentation. Instream construction could also increase pH due to stream water or runoff contacting fresh or uncured cement or introduce fuels and oil into the water. The Proposed Project would complete in–water work between July 1 and October 15, the low–flow period, to minimize water quality impacts. Rugraw will also develop and implement a SWPPP, which, as discussed above, would include additional erosion and sediment control measures to minimize water quality impacts and isolate in–water work areas.

Under the Proposed Project, the 40–foot–wide pipeline and penstock corridor would be cleared and graded to establish access for excavation that would result in a total of 21,560 CY of excavated and backfilled material. The pipeline would be positioned in the excavated trench and then backfilled and graded. Excavation, trenching, and backfilling construction activities could potentially increase turbidity by increasing sedimentation and soil erosion in runoff. As previously mentioned, Rugraw will implement a SWPPP that would include measures to prevent or minimize erosion and sedimentation during construction, such as salvaging and stockpiling topsoil and following construction and replacing, regrading, and seeding topsoil with native vegetation. Rugraw would also restore disturbed stream and riparian habitat to pre–construction conditions.

Construction of the Proposed Project's powerhouse and tailrace would require an estimated 16,800 CY of excavation/cut. The powerhouse foundation would be formed and approximately 200 CY of reinforced concrete would be poured. The excavation would be completed and placed in the channel prior to being backfilled (approximately 175 CY of backfill). Excavation, trenching, and backfilling construction activities could potentially increase sedimentation and soil erosion in runoff and result in hazardous substance spills.

Construction of the Proposed Project's substation, transmission and power lines, and the switchyard would all require clearing and grading, which could also increase sedimentation and soil erosion in runoff. The previously mentioned SWPPP would also minimize the impact of these activities on water quality.

The Proposed Project's construction activities have the potential to exceed Basin Plan water quality objectives and impact water quality. The general construction measures and Environmental Management and Monitoring Plans Rugraw has proposed are appropriate, but are not sufficient to prevent or minimize impacts to water quality. There is limited opportunity for construction to affect water temperature as the construction site is small and flow connectivity

would be maintained. Similarly, there is limited opportunity for construction to affect fecal coliform, but measures are needed to protect other water quality parameters.

Seven Recommended Measures (WQ–1 to WQ–7) are identified to minimize impacts to water quality. With implementation of these recommended measures, along with the general construction measures and environmental management and onitoring lans proposed by Rugraw (see *Section 4.13.4, Applicant–Proposed Measures*), construction impacts would be less than significant with mitigation. However, as Rugraw has not agreed to implement these recommended measures, construction impacts would be significant and unavoidable.

Construction Impacts

- **Level of Significance:** Significant and Unavoidable
- **Recommended Measure WQ–1 (same as AQU–1): Water Quality Monitoring and Compliance**

  The following measure would be included in the Proposed Project Turbidity and pH Monitoring Plan:

  – Monitoring of turbidity, suspended sediment, settleable material, pH, and dissolved oxygen during construction;

  – Compliance with the Central Valley Basin Plan (CVRWQCB, 2018) water quality criteria for turbidity, suspended sediment, settleable material, pH and dissolved oxygen during construction;

  – Stop–work conditions and remedial approaches for water quality non–compliance; and

  – Reporting of construction water quality monitoring results to State Water Board and CDFW.

- **Recommended Measure WQ–2: Water Quality and Hazardous Material Training**

  Annually, including prior to Proposed Project implementation, all contractor and subcontractor personnel would receive training regarding the appropriate work practices necessary to effectively comply with the applicable environmental laws and regulations, including, water quality compliance and hazardous materials spill prevention and response measures.

- **Recommended Measure WQ–3: Hazardous Material Business Plan**

  A Hazardous Materials Business Plan would be prepared and implemented. The plan would:

  – Identify all hazardous materials, including Portland cement concrete.

  – Identify spill response materials.

  – Specify procedures for notification and reporting, including internal management and local agencies (e.g., fire department, Department of Environmental Health), as needed.

  – Specify measures to manage and remediate waste, as needed.

- **Recommended Measure WQ–4: Spill Prevention and Countermeasure Plan**

  A Spill Prevention Control and Countermeasure Plan would be prepared and implemented. The plan would:

  – Prevent fuel from being stored in or near a floodplain.

  – Identify fuel storage areas that will prevent spill from being routed off site into waterways.

  – Identify measures to limit and control fuel spills, including use of bermed storage areas, equipment inspections, fueling and refueling procedures.

  – Describe the use and placement of spill kits.

  – Specify reporting requirements in the event of a spill.

- **Recommended Measure WQ–5: Material Disposal Measure**

  Hazardous materials or other materials that can affect water quality would not be disposed of or released onto the ground, the underlying groundwater, or any surface water. Totally enclosed containment would be provided for all trash. All construction and maintenance waste, including trash and litter, garbage, other solid waste, petroleum products, and other potentially hazardous materials (including equipment lubricants, solvents, and cleaners), would be removed to an appropriate waste facility permitted or otherwise authorized to treat, store, or dispose of such materials.

- **Recommended Measure WQ–6: Hazardous Material Spill Kits**

  Hazardous materials spill kits would be maintained onsite and in vehicles for small spills. These kits would include oil–absorbent material and tarps to contain and control any minor releases. During Proposed Project activities, emergency spill supplies and equipment would be kept adjacent to all areas of work and in staging areas and would be clearly marked. Detailed information for responding to accidental spills and for handling any resulting hazardous materials would be provided in the Spill Prevention Control and Countermeasure Plan.

- **Recommended Measure WQ–7: SWPPP BMPs**

  The SWPPP would specify the location, type, and maintenance requirements for best management practices (BMPs) necessary to prevent stormwater runoff from carrying construction–related pollutants that currently are not identified in Rugraw's SWPPP or Erosion Control and Sedimentation Plan. BMPs would be implemented to address potential release of fuels, oil, and/or lubricants from operational vehicles and equipment (e.g., drip pans, secondary containment, washing stations), as well as release of fine sediment from material stockpiles (e.g., sediment barriers, soil binders). The SWPPP would be developed and implemented by a Construction General Permit Qualified SWPPP Practitioner/ Qualified SWPPP Developer and submitted to the RWQCB as part of obtaining regulatory approval for the proposed activities (i.e., the Industrial General Permit).

Operation and Maintenance

Potential water quality and hydrology impacts related to minimum instream flow and changes in flow, dissolved oxygen, temperature, turbidity, sediment, and large woody debris associated with operation and maintenance of the Proposed Project are addressed in *Section 4.6.6.1*.

During operation and maintenance of the Proposed Project, access roads would be used for project operations, inspection, and maintenance activities. Typically, regular maintenance could involve up to 24 vehicle trips per week and would most likely occur once a year in the fall. However, maintenance is not likely to be required every year. Periodic use of access roads for Proposed Project operations would occur as needed and would typically involve up to four vehicle trips per week. The use of vehicles and access roads could result in an accidental fuel or oil spill that could contaminate surface water. Similarly, maintenance of equipment at the powerhouse and diversion dam could result in hazardous material spills. The Proposed Project does not include an Applicant–proposed measure that addresses operations related hazardous material spills.

Long–term use of road and work areas around the proposed powerhouse and diversion structure could result in erosion, sedimentation, and runoff which may impact water quality. Rugraw would be responsible for maintenance of Proposed Project access roads, including any maintenance required for the two new permanent road extensions required to access Project facilities. Grading of gravel access roads, culvert installation, and grading are potential maintenance activities that could result in temporary violation of water quality standards. These activities may result in ground disturbances that could increase soil erosion, sedimentation, and runoff. The Proposed Project's Erosion Control and Sedimentation Plan addresses construction related issues, but does not address longer–term operational issues.

Pest management would occur seasonally, and as often as monthly, if required to deter rodents and insect nests from facilities. Herbicide application to manage vegetation would occur every other year. Pesticide and herbicide application would be provided by a licensed contractor utilizing methods and/or approved for use by the State of California and monitored by Project operations personnel. Herbicide and pesticide use have the potential to release hazardous material into surface waters. Rugraw's Proposed Measures and other environmental management and monitoring plans do not include measures to protect water quality related to the use of pesticides and herbicides.

Rugraw's proposed measures and other environmental management plans do not include measures to address operational and maintenance issues related to potential hazardous material spills, erosion and sedimentation related to Proposed Project roads and work areas, or potential herbicide/pesticide related water quality issues that could result in significant impacts to water quality. Recommended Measures WQ–2 through WQ–6, discussed above, would need to be implemented for long–term operations and maintenance activities to protect water quality from hazardous materials spills. The proposed Erosion Control and Sedimentation Plan does not address erosion or sedimentation related to Proposed Project access roads and work areas (see Recommended Measure WQ–8 below). In addition, the Proposed Project does not include a measure related to pesticide and herbicide use (See Recommended Measure WQ–9 below). With implementation of these additional recommended measures, operation and maintenance impacts to water quality would be less than significant with mitigation. However, as

Rugraw has not agreed to implement these recommended measures, operation and maintenance impacts would be significant and unavoidable.

Operation and Maintenance Impacts

- **Level of Significance:** Significant and Unavoidable
- **Recommended Measure: WQ–8: Operational Erosion and Sedimentation Control**

  The Erosion Control and Sedimentation Plan would include annual reporting and BMPs to address control of erosion and sedimentation related to Proposed Project access roads, work areas, and facilities. The plan, including appropriate BMPs, would be developed in collaboration with the State Water Board and CDFW. Annually Rugraw would report any Proposed Project related erosion or sedimentation issues and remedial actions to address the erosion or sedimentation to the State Water Board and CDFW.

- **Recommended Measure WQ–9: Pesticide and Herbicide Use**

  A measure would be developed in collaboration with the State Water Board and CDFW to identify and implement pesticide and herbicide BMPs to protect surface water in the vicinity of the Proposed Project during operation and maintenance activities. At a minimum the BMPs would include allowable pesticide/herbicides, buffer areas near surface water, and application methods.

4.13.5.2 Impacts Related to Groundwater Supplies, Recharge, or Management

IMPACT 4.13–2: Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?

Construction

Domestic water supply facilities along the upper reaches of the South Fork Battle Creek, near Mineral, CA, primarily consist of groundwater wells. According to DWR's SGMA 2019 Basin Prioritization and as shown in Figure 4.13–4, South Battle Creek Basin (Basin Number 5–006.06) is very low priority (DWR, 2019). Therefore, the basin in the vicinity of the Proposed Project is not subject to SGMA.

The Proposed Project would not utilize groundwater supplies during construction. There would be no use or withdrawal from the water table. There are no groundwater wells in the Proposed Project area. The maximum excavation depth required by the Proposed Project would be 20 feet for pipeline construction. Typically, in the Project Area the ground water table is anticipated to be deeper than this, except near the stream/floodplain. Therefore, construction activities are not expected to cut into the groundwater table and will have no impact on groundwater supplies.

In–water construction work will require isolating and dewatering portions of the stream. This would decrease the area available for groundwater recharge. However, these dewatered areas would be relatively small (i.e., no larger than the diversion dam) when compared to the entire South Fork Battle Creek and temporary (no longer than two and a half months). In–water work would only occur between July 1 and October 15, when flows are low and, occasionally, parts of the stream

naturally go dry (Figure 4.13–6). Additionally, all water would return to the stream at the end of the dewatered area. For these reasons, construction of the Proposed Project would not significantly impact groundwater recharge.

The Proposed Project's construction impacts to groundwater management, including groundwater supplies and recharge, would be less than significant.

Construction Impacts

- **Level of Significance:** Less Than Significant Impact
- **Mitigation Measures:** None required

Operation and Maintenance

Water would not be needed to for operation and maintenance activities. There will be no withdrawal from the groundwater table during operation or maintenance of the Proposed Project.

Because the Proposed Project would operate in run–of–river mode, the Proposed Project would not store water or divert water for any purpose other than hydropower and the sum of all outflows from the Proposed Project would approximately equal to the sum of all inflows at any given time. The Proposed Project would bypass approximately 2.4 miles of South Fork Battle Creek. The bypass reach would contain less water for groundwater recharge; however, all flow would return to the stream and be available for groundwater recharge at the end of the 2.4–mile bypass reach. Additionally, the Project would maintain a minimum instream flow of 13 cfs in the bypass reach when the Proposed Project is operating. By operating in this manner, the Proposed Project's diversion of water would not significantly impact groundwater recharge. Furthermore, there are no other water users in the Proposed Project area and the groundwater basin is a very low priority basin. As such, the Proposed Project would not impede groundwater management of the basin.

The Proposed Project does not propose installation or use of a groundwater well and there are no groundwater wells in the Proposed Project area. Operation and maintenance of the Proposed Project would not include any activities that would require excavation over 20 feet. It is anticipated the groundwater table in the Project area is typically greater than 20 feet, except in the vicinity of the stream and associated floodplain. Therefore, operation and maintenance activities are not expected to cut into the groundwater table. For these reasons, the Proposed Project is not expected to cause lowering of the groundwater table, cause a substantial decrease in groundwater supplies, or interfere with groundwater recharge. Operation and maintenance impacts of the Proposed Project on groundwater supply or recharge would be less than significant.

Operation and Maintenance Impacts

- **Level of Significance:** Less Than Significant Impact
- **Mitigation Measures:** None Required

4.13.5.3 Impacts Related to Alteration of the Drainage Pattern or Stream

IMPACT 4.13–3: Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:
i. Result in substantial on– or offsite erosion or siltation?

Construction

Proposed Project construction activities include the mobilization of construction equipment and personnel, which would utilize two constructed access roads and upgrades to an existing road, 120A7. Road construction and upgrades would require ground–disturbing activities such as grading and resurfacing. As a result, there is potential for increased localized erosion and siltation to occur as runoff increases. Rugraw has agreed to implement measures, such as surfacing permanent roads with gravel, and develop and implement a SWPPP to prevent erosion and sedimentation during Proposed Project construction. The implementation of these measures would minimize the impact of on– or offsite erosion or siltation.

As discussed in Impact 4.13–1, the Proposed Project also include in–water construction activities. For the construction of these in–water structures, approximately 565 CY of excavation, 95 CY of poured in–place concrete, and 400 CY of backfill are required. Construction of the diversion dam and intake structure would occur during the low flow season and temporarily alter the location of existing streamflow from one side of the river to another during the construction process so that construction could be accomplished under dry conditions. However, this would result in small local, temporary changes to the channel and substantial erosion or siltation is not expected to occur under the low flow conditions.

Construction of other facilities that include impervious material, such as the pipeline and penstock, powerhouse and tailrace, substation, and switchyard, would require ground–disturbing actions such as excavation, trenching, vegetation clearing, and other earth disturbing activities. These actions may result in increased erosion and siltation. Excess excavated material would be utilized as road base and spread on multipurpose sites. Stockpiled material would be protected from runoff and sediment load generation by utilizing proper Stormwater Pollution Prevention methods. To minimize erosion and siltation, Rugraw would implement measures including revegetation of disturbed areas, restoration of disturbed stream and riparian habitat to pre–construction conditions, and implementation of a SWPPP. Impacts related to on or offsite erosion or siltation would therefore be considered less than significant.

Construction Impacts

- **Level of Significance:** Less Than Significant Impact
- **Mitigation Measures:** None required

Operation and Maintenance

To minimize operation and maintenance impacts of the Proposed Project, Rugraw would implement a Debris and Sediment Management Plan to ensure sediment release operations from the diversion structure are completed in a manner that would maintain the natural sediment transport connectivity in the stream and not increase sediment deposition (except when some

sediment is captured temporarily during the diversion season). Rugraw's Debris and Sediment Management Plan also includes periodic surveys of the diversion pool and manual removal of woody debris accumulated on the intake structure trash rack.

Long–term use of the roads would require periodic upgrades that could increase erosion, sedimentation, and runoff resulting in siltation. Rugraw would be responsible for routine maintenance of Proposed Project access roads. Routine inspection and maintenance of roads and drainage facilities would be performed by onsite personnel, including grading of gravel access roads. Culvert installation and more substantial grading would be performed by a contractor licensed to perform road maintenance work. These maintenance activities could result in an increase in erosion or siltation. Rugraw would need to implement Recommended Measure WQ–8, Operational Erosion and Sediment Control, discussed in Impact 4.13–1, to minimize erosion or siltation associated with operation and maintenance.

With implementation of the Debris and Sediment Management Plan and Recommended Measure WQ–8, Operational Erosion and Sediment Control, the Proposed Project operation and maintenance impacts related to erosion or siltation would be less than significant with mitigation. However, Rugraw has not agreed to implement this measure, so operation and maintenance impacts would be significant and unavoidable.

Operation and Maintenance Impacts

- **Level of Significance:** Significant and Unavoidable
- **Recommended Measure: WQ–8: Operational Erosion and Sedimentation Control**

ii. Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on or offsite?

Construction

Rugraw has agreed to develop and implement a SWPPP to prevent storm–induced erosion and sedimentation during ground–disturbing construction activities as part of the general construction measures. In addition, the Proposed Project would comply with the State Water Board's Construction General Permit. Rugraw's general construction measure (listed in Section 4.13.4) would minimize surface runoff created by the Proposed Project by ensuring that materials from construction (e.g., soil, rock, and other debris) would not be discharged to surface waters nor deposited where they could be eroded and carried to the stream by surface runoff or high stream flows.

With implementation of these measures and management and monitoring plans, impacts to surface runoff due to construction activities would be less than significant.

Construction Impacts

- **Level of Significance:** Less Than Significant Impact
- **Mitigation Measures:** None required

Operation and Maintenance

The Proposed Project would create impermeable surfaces that would contribute to surface runoff, including the powerhouse (50 x 51 feet) with an associated disturbance area of 60X90 feet and a substation (40X42 feet) with an associated disturbance area of 50X51 feet. The Proposed Project would also include two access roads totaling approximately 2,300 feet in length and 20 feet in width (46,000 square feet). The total impermeable surface would be 1.24 acres (about 1 acre–feet of water in a 10–inch rainstorm event or 0.5 cfs for a day). This amount of runoff created would be relatively small and distributed in different parts of the watershed and would not result in onsite or offsite flooding; therefore, operation and maintenance impacts would be less than significant.

Operation and Maintenance Impacts

- **Level of Significance:** Less Than Significant Impact
- **Mitigation Measures:** None required

iii. 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?

There are no existing or planned stormwater drainage systems in the Proposed Project area. Therefore, the following analysis addresses additional sources of polluted runoff.

Construction

Proposed Project construction activities may result in polluted runoff. The initial construction activities of mobilizing construction equipment, personnel, and staging of materials require the use of vehicles and access roads. These activities could potentially result in polluted runoff if a spill occurs during the transportation or use of hazardous materials. As shown in Table 2–2, construction activities are expected to require a total of 1,404 vehicle trips. A spill could occur during the fueling of vehicles required to complete these 1,404 trips, or while operating the equipment and vehicles, and a hazardous spill of fuel could result in polluted runoff. Other construction activities may utilize hydraulic fluid and lubricants that are also hazardous materials. However, Rugraw has agreed to develop and implement a SWPPP (general construction measure) to identify and implement BMPs for construction activities with the potential to cause erosion, stream sedimentation and Recommended Measures WQ–1 through WQ–7 address monitoring water quality and BMPs to prevent release of hazardous materials.

The potential effects of construction–related runoff would be minimized through implementation of general construction measures limiting the land disturbance, using existing roads to the extent possible, and conducting the work when stream flows are low (July 1–October 15) (as listed in Section 4.13.4). With the implementation of these measures and Recommended Measures WQ–1 through WQ–7, construction impacts related to capacity of drainage systems or the addition of polluted runoff would be less than significant with mitigation. However, Rugraw has not agreed to implement these measures, so construction impacts would be significant and unavoidable.

Construction Impacts

- **Level of Significance:** Significant and Unavoidable
- **Recommended Measures: WQ–1 through WQ–7**

Operation and Maintenance

The Proposed Project would create impermeable surfaces that would contribute to surface runoff, including the powerhouse (50 x 51 feet) with an associated disturbance area of 60X90 feet and a substation (40X42 feet) with an associated disturbance area of 50X51 feet. The Proposed Project would also include two access roads totaling 2,300 feet in length and 20 feet in width (46,000 square feet). The total impermeable surface is 1.24 acres (about 1 acre–feet of water in a 10–inch rainstorm event or 0.5 cfs for a day). The Proposed Project operations and maintenance could also create turbid water from roads and potential hazardous substance (oil, fuels, solvents) spills and/or runoff.

Due to the small amount of runoff, and with implementation of Recommend Measures WQ–2 through WQ–8 that address BMPs to minimize the potential for hazardous material spills and erosion/sedimentation during operation and maintenance impacts related to stormwater drainage and polluted runoff would be less than significant with mitigation. However, Rugraw has not agreed to implement these measures, so operation and maintenance impacts would be significant and unavoidable.

Operation and Maintenance Impacts

- **Level of Significance:** Significant and Unavoidable
- **Recommended Measures: WQ–1 through WQ–8.**

iv. Impede or redirect flood flows?

As discussed in Section 4.13.1.5, the Proposed Project area is located in Flood Hazard Zone X, an area with minimal flood hazards.

Construction

Construction activities for the Proposed Project include instream work for construction of the diversion/intake structure and earthmoving and grading associated with the pipeline, penstock, and powerhouse. The Proposed Project's predominant onsite construction activities, and any work requiring excavation or grading, would take place between approximately April 15 and October 15, which is the typical dry season in northern California. Instream work would occur from July 1 through October 15 when streamflows are particularly low. Given the minimal flood hazard potential and the fact that construction would occur in the dry season, the potential for flood flows would be minimal.

Construction activities would not significantly impede or redirect flood flows since construction activities would occur in the dry season and the Project area is not located within a flood hazard zone. The impact would be less than significant.

Construction Impacts

- **Level of Significance:** Less Than Significant Impact
- **Mitigation Measures:** None required

Operation and Maintenance

Proposed Project includes a diversion structure in the creek, which has a relatively small diversion pool approximately 50 feet wide by 320 feet long with a depth of 8 feet at the diversion tapering upstream to a small depth as the stream enters the pool. The total volume is approximately 1.5 acre–feet. The diversion dam includes six 8–feet wide pneumatic gates that can be lowered during storm events. The diversion also has 6–feet wide slide gates on both sides. The total gate opening is similar in size to the natural channel. The diversion is located in a portion of the channel that has elevated topography on either side of the diversion. In the event of a flood event, the gates would be lowered and the flood flow would pass through the diversion structure unimpeded. The structure would not impede or redirect the flood flow.

Operation and Maintenance Impacts

- **Level of Significance:** Less Than Significant Impact
- **Mitigation Measures:** None required

4.13.5.4 Impacts Related to Pollution due to Inundation

IMPACT 4.13–4: In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?

Construction, Operation, and Maintenance

The Proposed Project area is not located near an ocean, perennial lake, or river. Therefore, the Proposed Project is not subject to inundation by seiche or tsunami. As mentioned previously, the Proposed Project is located in an area with minimal flood hazards. If a flooding event occurred, the potential release of pollutants from the Project would most likely be from flooding of fuel storage or accidental spill of fuel being used during Proposed Project activities. As mentioned in Section 4.12, Hazards and Hazardous Waste, the Proposed Project is not anticipated to require substantial amounts of hazardous materials. In addition, the SWPPP (see Section 4.13.4) would likely include BMPs to reduce the risk of accidental spills, which would further reduce the potential to release pollutants. However, hazardous substances are not specifically addressed in Rugraw's general construction measures. Recommended Measures WQ–2 through WQ–7 would be required to ensure there is not a significant impact. In particular, Recommended Measure WQ–4 ensures that hazardous materials will not be stored in or near a floodplain. The impacts relating to release of pollutants due to inundation by seiche, tsunami, or flood would be less than significant with mitigation with implementation of the Recommended Measures WQ–2 through WQ–7. However, Rugraw has not agreed to

implement these measures, so operation and maintenance impacts would be significant and unavoidable.

Construction, Operation, and Maintenance Impacts

- **Level of Significance:** Significant and Unavoidable
- **Recommended Measures: WQ–2 through WQ–7**

4.13.5.5 Impacts Related to Regulatory Plans

IMPACT 4.13–5: Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?

Construction, Operation, and Maintenance

As discussed in Section 4.13.1.3, water quality in the Proposed Project area is managed by the CVRWQCB under the Basin Plan. As summarized in Table 4.13–3, The Basin Plan provides water quality objectives for temperature, dissolved oxygen, pH, turbidity, fecal coliform, and oil and grease. The Proposed Project would require construction activities both in and adjacent to the creek that would utilize hazardous materials and have potential for accidental spills, which may result in exceedance of the pH and oil and grease objectives. Activities such as dewatering, excavation, and dredging in the channel could also affect water quality by altering the pH and turbidity of the creek. Construction is not expected to impact water temperature or fecal coliform levels.

As discussed in Section 4.13.4, Rugraw would conduct in–water work activities during the low–flow period, between July 1 and October 15, which would limit the extent that water quality would be affected by construction activities. Rugraw would implement a Turbidity and pH Monitoring Plan, but the details are not included in the plan to detect changes in various water quality parameter concentrations and include control measures that would return water quality to required concentrations. Recommended Measure WQ–1 provides monitoring and reporting of water quality parameters that is consistent with the Basin Plan. Rugraw has also agreed to implement control measures to minimize runoff, erosion, and dust, including surfacing permanent roads with gravel to maintain a stable road surface, initiating construction activities immediately following vegetation clearing to minimize the exposure of disturbed areas to wind, installing of silt fences, and applying water to disturbed soil areas. The Rugraw measures, however, do not address hazardous materials or operational issues related to erosion and sedimentation or use of pesticides/herbicides near water bodies. Recommended Measures WQ–2 through WQ–9 address hazardous materials, erosion/sedimentation, and pesticides/herbicides.

Compliance with Rugraw's measures would also need to be augmented with Recommend Measures WQ–1 through WQ–9 to minimize water quality impacts during construction, operations and maintenance. Therefore, the Proposed Project is expected to conflict with implementation of the Basin Plan without implementation of the Recommended Measures.

With regard to groundwater, the Tehama County Flood Control and Water Conservation District has been recognized by the DWR as the GSA for the Redding Area South Battle Creek

groundwater basin in the vicinity of the Proposed Project. The District formed the Tehama County Groundwater Sustainability Agency Groundwater Commission in 2016 and this commission is in the process of developing a GSP that will be completed before January 31, 2022. As discussed in Section 4.13.2.2, the Redding Area South Battle Creek basin has been classified as very low priority under DWR's SGMA 2019 Basin Prioritization and is not subject to SGMA. However, the GSA for this basin has opted to create a GSP.

The Proposed Project is not expected to significantly impact the very low priority groundwater basin or groundwater wells. With the implementation of Rugraw's general construction measures and environmental management plans, any potential impacts to groundwater would be minimized. Therefore, the Proposed Project would not conflict with or obstruct implementation of the GSP upon its creation and implementation.

Overall, the Proposed Project would not affect ground water management plans, but could significantly affect implementation of the Basin Plan. With implementation of Recommended Measures WQ–1 through WQ–9 impacts would be reduced to less than significant with mitigation. However, Rugraw has not agreed to implement these measures, so operation and maintenance impacts would be significant and unavoidable.

Construction, Operation, and Maintenance Impacts

- **Level of Significance:** Significant and Unavoidable
- **Recommended** Measures: **WQ–1 through WQ–9**

4.13.6 References

California State Water Resources Control Board (State Water Board). 2014/2016 California Integrated Report Clean Water Act Sections 303(d) and 305(b). April 8, 2015. Available at: www.waterboards.ca.gov

California State Water Resources Control Board (State Water Board). 2010. Storm Water Construction General Permit. Available at: www.waterboards.ca.gov.

California Department of Water Resources (DWR) 2020. Groundwater Sustainability Plans. Available at: water.ca.gov

California Department of Water Resources (DWR). 2019. Sustainability Groundwater Management Act Basin Prioritization. Available at: gis.water.ca.gov.

CEQA (California Environmental Quality Act). 2020. Appendix G: Environmental Checklist Form. Available at: resources.ca.gov.

CFR (Code of Federal Regulations). 2020. Title 40 Part 131 California Toxics Rule. Available at: www.govinfo.gov.

Clynne, M.A. and L.J.P. Muffler. 2010. Geologic map of Lassen Volcanic National Park and vicinity, California. United States. Geological Survey. Available at: pubs.usgs.gov. Accessed July 7, 2017.

Cramer, S.P., K. Sellheim, P.J. Haverkamp, K. Ceder, and J. Simonis. 2015. Lassen Lodge hydroelectric project fish habitat survey and capacity modeling final report, South Fork Battle Creek. Prepared for Rugraw, LLC. Revision Number 2.

Central Valley Regional Water Quality Control Board (CVRWQCB). 2018. Water Quality Control Plan for the California Regional Water Quality Control Board Central Valley Region for the Sacramento River Basin and the San Joaquin River Basin. Fifth Edition. Revised May 2018 (with Approved Amendments).

ECORP (ECORP Consulting, Inc.). 2010. Benthic macroinvertebrate study in support of License Application for the Lassen Lodge Hydropower Project, South Fork Battle Creek.

EPA (Environmental Protection Agency). 2002. Clean Water Act. Available at: www.epa.gov.

FEMA (Federal Emergency Management Agency). 2020a. Flood Insurance Rate Map for Tehama County Unincorporated Areas. Available at: msc.fema.gov.

FEMA (Federal Emergency Management Agency). 2020b. Definitions of Flood Zone Designations. Available at: snmapmod.snco.us.

FERC (Federal Energy Regulatory Commission). 2018. Final Environmental Impact Statement for Hydropower License.

FERC (Federal Energy Regulatory Commission). Exhibit E Environmental Report Lassen Lodge Hydroelectric Project.

Jones & Stokes. 2005. Battle Creek Salmon and Steelhead Restoration Project Final Environmental Impact Statement/Environmental Impact Report. Volume I: Report. July (J&S 03035.03.). Sacramento, California.

Rehn, A.C. 2008. Benthic Macroinvertebrates as Indicators of Biological Conditions Below Hydropower Dams on West Slope Sierra Nevada Streams, California, USA. River Research and Applications. Published online in Wiley InterScience (www.interscience.wiley.com) DOI: 10.1002/rra.1121

Rugraw. 2014. Lassen Lodge FERC application for license. Rugraw, LLC. Redding, California.

State Water Board. 2019. Porter–Cologne Water Quality Control Act. Water Code Division 7 and Related Sections. As amended, including Statutes 2018. Available at: www.waterboards.ca.gov.

Tehama (Tehama County). 2009. Tehama County General Plan. Available at: www.co.tehama.ca.us.

Tehama (Tehama County). 2012. Tehama County Groundwater Management Program. Available at: www.tehamacountypublicworks.ca.gov.

Tehama (Tehama County). 2020. Tehama County Groundwater Sustainability Plan. Available at: www.tehamacountypublicworks.ca.gov.

Tetra Tech. 2015a. Water Quantity and Quality Technical Study, Lassen Lodge Hydroelectric Project FERC Number 12496, South Fork Battle Creek, Tehama County, California. Revision 1. Prepared for Rugraw, LLC.

USGS. (United States Geological Survey). 2020. Groundwater Levels for the Nation. USGS 401351122112001, 401505122132001, 402110122112701. Available at: waterdata.usgs.gov.

USGS. (United States Geological Survey). 2017a. USGS 11381500 Mill Creek near Los Molinos, California. Available at: waterdata.usgs.gov.

USGS. (United States Geological Survey). 2017b. USGS 11383500 Deer Creek near Vina, California. Available at: waterdata.usgs.gov.

Watercourse Engineering. 2015. Water Temperature Model Development and Application: South Fork Battle Creek, Lassen Lodge Hydroelectric Project (FERC No. 12496), Final Report

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4.14 Land Use and Planning

This section discusses potential impacts to land use and planning that could result from construction, operation, and maintenance of the Proposed Project. If necessary, mitigation measures are identified to reduce impacts. This analysis was based on review of existing environmental documents, and applicable land use and planning regulations.

4.14.1 Environmental Setting

4.14.1.1 Regional Setting

The Proposed Project is located on the northeast side in an unincorporated area of Tehama County. This area of the County is largely dominated by forestry, rural development, and open space uses. The land cover is mostly forested or shrub/scrub vegetation, with some areas of grassland, developed open space, and low and medium intensity development. Figures 4.14–1 and 4.14–2 show Tehama County General Plan and Zoning information in the Proposed Project area.

The Proposed Project would be located on land owned or managed by SPI, Tehama County, and other private landowners. Rugraw has long–term or Grant Deed easements on the property where project facilities would be located (FERC, 2018). The Proposed Project would utilize existing, currently maintained, and active SPI, Pacific Gas & Electric Company (PG&E) access roads, and County roads (South Powerhouse Road and Hazel Road). There are no federally owned lands within the Proposed Project area.

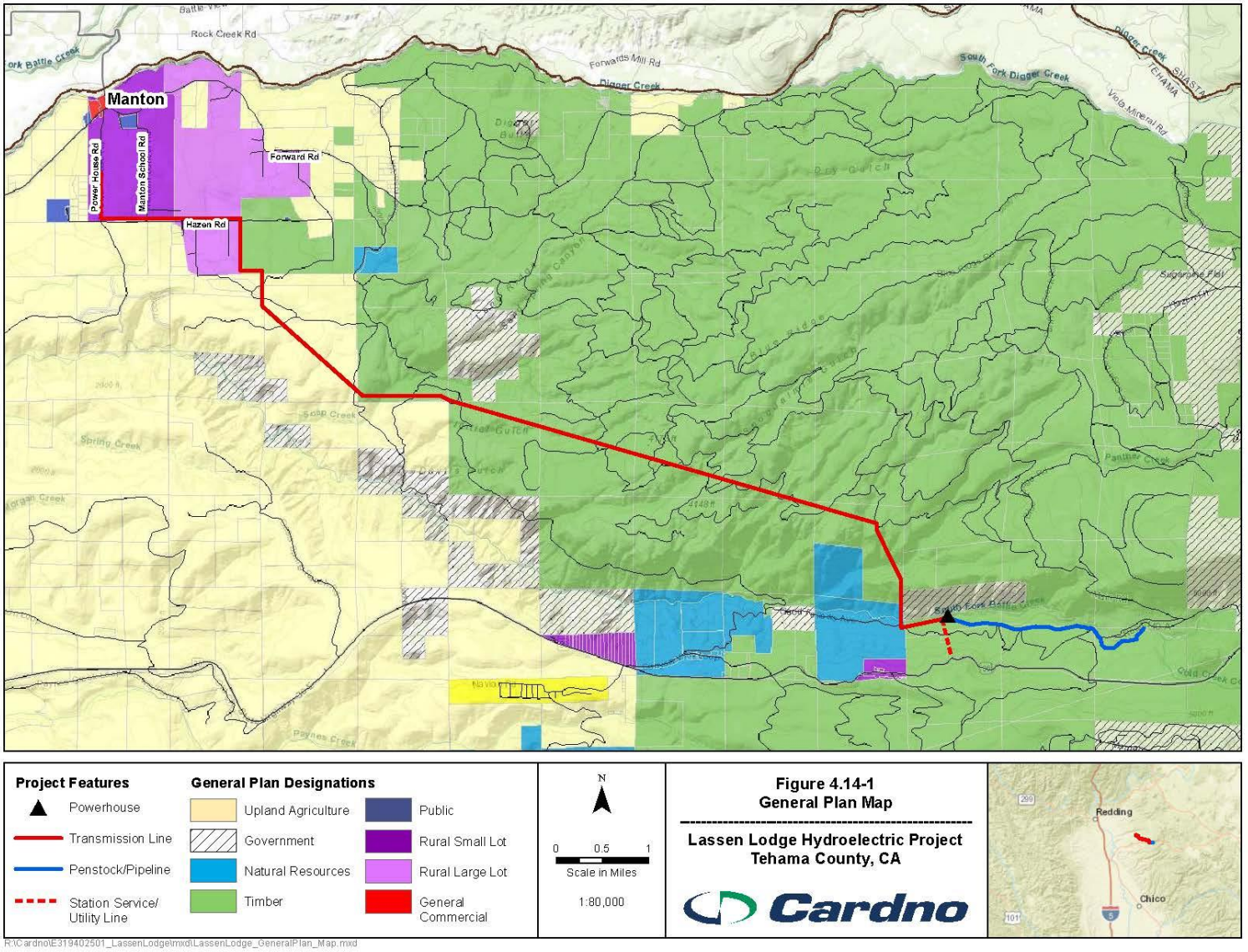

Figure 4.14–1. General Plan Map

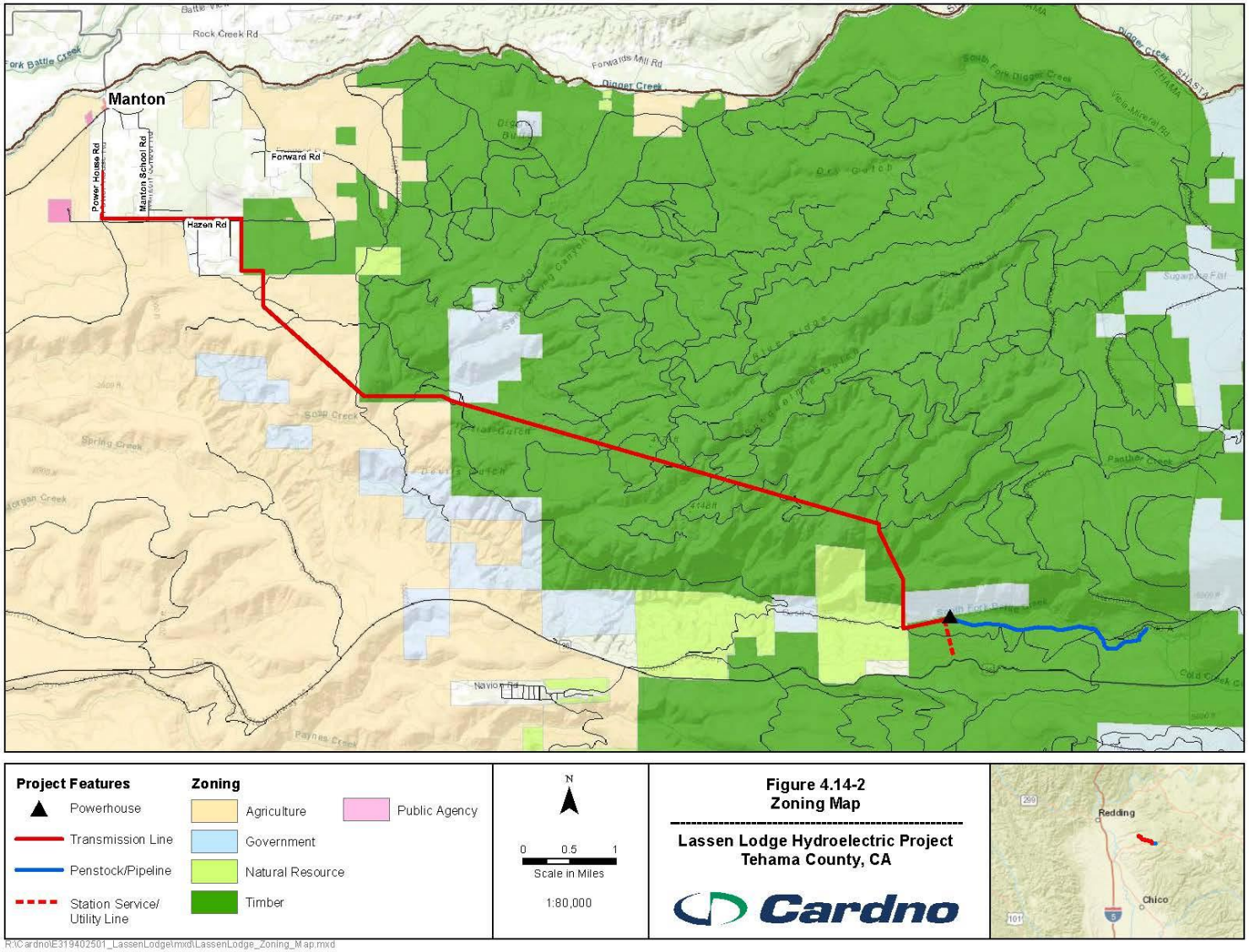

Figure 4.14–2. Zoning Map

4.14.2 Regulatory Setting

4.14.2.1 Federal and State

There are no federal or state land use and planning regulations relevant to the Proposed Project.

4.14.2.2 Local

Tehama County

General Plan Policies and Implementation Measures

The 2009 Tehama County General Plan governs land use and development in the Proposed Project area. Tehama County General Plan policies and implementation measures applicable to hydroelectric projects include the following:

- *Policy LU–5.3:* The County shall accommodate growth and other non–agricultural development by directing new growth to lands that do not exhibit characteristics which would support agricultural uses and to areas for which services and infrastructure have been planned to support new growth.
- *Policy ED–3.1:* The County shall prioritize the recruitment of appropriately–suited industries that provide above–average wages to employees as described by the Employment Development Department average wage data for the County of Tehama, thereby broadening employment opportunities for County residents.
- *Policy ED–6.3:* The County shall accommodate urban growth and other non–agricultural development by utilizing, whenever possible, lands that do not have agricultural viability as defined in the Agriculture and Timber Element of the County General Plan.
- *Policy ED–7.1:* The County shall continue to preserve Tehama County's natural resources including: agriculture, timberlands, water and water quality, wildlife resources, minerals, natural resource lands, recreation lands, scenic highways, and historic and archaeological resources. The protection of natural resources is of the utmost importance and promoting business expansion, retention, and recruitment should compliment and enhance the natural resources while reducing negative impacts.
- *Policy OS–3.7:* The County shall promote best management practices of natural resources that will enhance wildlife habitat.
  - *Implementation Measure OS–3.7a*: Water diversions/dams constructed along anadromous fish streams shall be designed to protect fish populations and to ensure adequate flow levels for spawning activity during migratory seasons in accordance with State and Federal regulations.
- *Policy OS–9.3*: The County shall seek inter–jurisdictional cooperation and coordination on natural resources practices and recreation plans with an emphasis on economic impacts.
  - *Implementation Measure OS–9.3a*: Actively pursue opportunities to market and capitalize on the County's abundant natural resources to enhance economic development activities throughout the County.

- *Policy OS–10.1*: The County should protect and preserve significant archaeological and cultural resources.
  - *Implementation Measure OS–10.1d*: Require appropriate surveys and site investigations when needed as part of the initial environmental assessment for development projects in accordance with CEQA. Surveys and investigations shall be performed under the supervision of a professional archaeologist or other person qualified in the appropriate field, and approved by the County. It is recognized that Timber Harvest Plans have been declared by the State to be functionally equivalent to environmental assessments required by CEQA.
- *Policy AG–2.1*: The County shall provide for the conservation of commercial timberland resources and related habitat.
  - *Implementation Measure AG–2.1a:* The Timberlands land use category shall be used to identify and protect lands currently under Timber Production Zoning.
  - *Implementation Measure AG–2.1b:* Development of Timberlands shall be subject to the conditions established in the Zoning Code.
- *Policy SAF–1.4*: The County shall endeavor to maintain acceptable levels of risk of injury, death, and property damage resulting from reasonably foreseeable safety hazards in Tehama County.
  - *Implementation Measure SAF–1.4a*: Conduct an evaluation, as part of the CEQA process, of the potential safety hazards of proposed development within the County and mitigate impact as appropriate and practical to ensure a reasonable level of safety for residents, workers, and property owners.
- *Policy SAF–4.4*: The County shall incorporate seismic and geologic hazards mitigation measures into County ordinances and procedures.
  - *Implementation Measure SAF–4.4a*: All development proposals shall be referred to the County Planning Department, County Building and Safety Department, and Road Department/Public Works Department to review and comment on any potential seismic or geologic impacts or potential hazards. The environmental review for development proposals shall include a full inventory of potential soil, seismic, or geologic concerns; an assessment of potential project impacts; and identification of any mitigation and/or monitoring measures. Issues that are related to liquefaction and potential ground failure, if any, shall be addressed. Project design, grading, and building design and construction techniques shall be used, where appropriate, to minimize these hazards. The applicant shall be responsible for providing any and all studies pertaining to potential seismic and geologic hazards and per County requirements.

This is not a complete list of all policies and implementation measures in the General Plan that guide the development of hydroelectric projects. However, this list addresses General Plan policies applicable to hydroelectric development and is useful in addressing consistency of the Proposed Project with the General Plan identified above.

General Plan and Zoning Designations

The Tehama County General Plan assigns General Plan Land Use Designations for the County. General Plan designations consider the physical constraints and characteristics of the land intended to ensure consistency with the goals and polices of the General Plan, as well as other existing planning documents such as Specific Plans (Tehama County 2009). The Proposed Project is located in the Tehama County General Plan Eastern Planning Area. Most of the Proposed Project area falls under the Timber designation with small areas located within the Resource Lands, Upland Agriculture, and Public designations. Figure 4.14–1 shows the General Plan designations in the Proposed Project vicinity.

- *Timber* lands are designated to preserve these areas for timber related uses and prevent the conversion to non–timber uses. Permitted uses range from timber production to campgrounds. Additional uses may be allowed as long as they are deemed compatible with the permitted uses.
- *Natural Resource* lands are designated to protect natural resources for their economic, aesthetic, and ecological value.
- *Upland Agriculture* lands are designated to preserve land for grazing and agricultural uses. Also, included in the allowed uses is commercial recreation and mineral exploration.
- *Public* lands represent those lands under the jurisdiction of a federal or state agency.
- *Rural Small Lot/Large Lot* designations are for areas identified for typically larger lots and a more dispersed rural development pattern, compared to other relatively compact areas with minimum lot sizes.

In Tehama County the General Plan Land Use designation and zoning designations represent compatible uses as shown in Table 4.14–1 (Table 2–5 from the 2009 Tehama County General Plan). The following zoning districts have been established by the County: Upland Agricultural (U–A), Valley Floor Agriculture (V–A), Residential Estates (RE), One– Family Residence (R–1), Two–Family Residence (R–2), Neighborhood Apartment (R–3), General Apartment (R–4), Neighborhood Commercial (C–1), Community Commercial (C–2), General Commercial (C–3), Local Convenience Center Commercial (C–4), General Recreation (G–R), Light Industrial (M–1), General Industrial (M–2), Public Agency (PA), Planned Development (PD), Natural Resource (NR), and Timber Production Zoning (TPZ).

Consistent with the General Plan Land Use designations, the 1984 Tehama County Charter and Code, *Title 17 – Zoning* dictates the zoning designations in Tehama County and the requirements and allowed uses of each designation. Figure 4.14–2 shows the zoning designations. The Proposed Project area is mostly located on lands zoned TPZ (Timber Production Zoning) with small areas zoned NR, AG–1 (Agricultural/Upland District), and PA District) (Tehama County 2009).

Table 4.14–1. Land Use Designation and Zoning Designations

General Plan Designation	Compatible Zoning
Upland Agriculture	E–A, U–A
Valley Floor Agricultural (Includes lands designated as VFA–El Camino and VFA–Capay)	EA, U–A
Timber	TPZ
Residential	
Rural Residential–large Lot	R–1, R–E
Rural Residential–Small Lot	R–1, R–E
Suburban	R–1, R–2
Urban	R–1, R–2, R–3, R–4
Commercial	
Neighborhood Center	C–1, C–4
General Commercial	C–1, C–2, C–3, C–4
Commercial Recreation	G–R
Industrial	
General Industrial	M–1, M–2
Natural Resource	
Habitat Resource	NR
Resource Lands	NR
Miscellaneous	
Special Planning	Specific / Master Plan
Public Facility	PA

Source: Tehama County General Plan, 2009

Tehama County Charter and Code Permitting

The Proposed Project would be subject to all rules and regulations of the Tehama County Charter and Code. The Proposed Project is required to obtain a Use Permit to allow for construction and operation of the proposed hydroelectric high voltage facility. The Use Permit application requires filing with the Planning Commission for approval and issuance (Title 17 section 17.70 – Use Permits). Additionally, the Proposed Project will require a building permit (Title 17 section 15.02.310 – Permits) and an Encroachment Permit (Title 17 section 16.50.030 – Encroachment Permit fee) to address construction roadway work and any obstructions to flow of traffic (Tehama County Code and Charter 1984). Rugraw has submitted applications for these permits, agreeing to be bound by the terms of those permits.

4.14.3 Analysis Methodology

4.14.3.1 Analytical Approach

This analysis addresses consistency of the Proposed Project with the local regulatory setting. For this analysis, construction and operation of the Proposed Project was reviewed for conformance with applicable General Plan Land Use designations, policies, and implementation measures, and County zoning designations and Code. This analysis also addresses whether the Proposed Project will result in any significant impacts to land use and planning. There area of assessment is Tehama County.

4.14.3.2 Criteria for Determining Significance

Appendix G of the 2020 CEQA Guidelines identifies that a Proposed Project would have a significant impact on land use and planning if it would:

- Physically divide an established community; or
- Conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect in a manner that would prevent the avoidance or mitigation result sought to be achieved by the plan, policy, or regulation.

4.14.4 Environmental Impacts and Mitigation

The Proposed Project does not include any environmental measures that specifically address land use impacts.

4.14.4.1 Impacts Related to Established Communities

IMPACT 4.14–1: Would the project physically divide an established community?

Construction, Operation, and Maintenance

As shown in Figure 4.14–1, the Proposed Project area is mostly located in a rural area of Tehama County surrounded by timber and agricultural uses. The Proposed Project begins with the diversion dam and intake structure, which is approximately 1.5 miles west of the town of Mineral. The powerhouse is approximately 4 miles west of Mineral. The transmission line runs northwest toward the town of Manton where it connects with PG&E lines at the PG&E 60 kV Volta–South transmission line at the south end of Manton.

The transmission line is the only portion of the Proposed Project located within an established residential community, in the unincorporated town of Manton. The transmission line route would be located along Hazen Road before turning north along South Powerhouse Road. The transmission line ROW would be located within Tehama County roadway easements, which requires a Use Permit and Encroachment Permit from the County. These uses are allowed with the acquisition of the permits. The addition of the transmission line and poles would not result in the community's inability to easily access areas in the Proposed Project area since it primarily runs along roadways. The small portion that crosses agricultural land would not create a division of the community.

The Proposed Project does not propose any new land uses that would physically divide an established community. Therefore, impacts are less than significant and no mitigation measures are required.

Construction, Operation, and Maintenance Impacts

- **Level of Significance:** Less Than Significant Impact
- **Mitigation Measures:** None required

4.14.4.2 Impacts Related to Land Use Plans, Policies, and Regulations

IMPACT 4.14–2: Would the project conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect in a manner that would prevent the avoidance or mitigation result sought to be achieved by the plan, policy, or regulation?

Construction, Operation, and Maintenance

General Plan Consistency

This Proposed Project is consistent with General Plan policies and implementation measures listed above. Several General Plan policies relate to growth, economy, and using natural resources for economic benefit. Construction of the Proposed Project in the short–term would stimulate the local economy through creation of jobs and generation of local income through payroll, local taxes, property tax revenue, and contribute indirectly to other existing businesses that support construction activities (e.g., rental equipment, purchasing supplies, construction staff expenditures, etc.). Additionally, the Proposed Project would use local natural resources for an economic benefit (consistent with Implementation Measure OS–9.3a). The median income in Tehama County from 2014–2018 was $42,899 (US Census Bureau 2019). As mentioned in section 3.3.8.2 (*Environmental Effects*) of FERC's Final EIS, the average annual payroll during construction would be approximately $75,000. This is significantly more than the County average income (consistent with Policy ED–3.1).

This Proposed Project is also consistent with General Plan policies and implementation measures related to environmental and resource protection (consistent with Policy ED–7.1) while promoting business expansion and reducing negative impacts. Potential environmental impacts and mitigation measures necessary to reduce those impacts to less–than–significant levels are identified throughout this document. Related to natural resources, the EIR analyses address impacts to wildlife habitat (Sections 4.6 and 4.7), aquatic resources (Sections 4.7 and 4.13), recreational plans (Section 4.16), archaeological and cultural resources (Sections 4.8 and 4.18), and timberland resources (Section 4.4) (consistent with Policies OS–3.7, OD–9.3, OS–10.1, and AG–2.1).

This EIR also addresses safety concerns associated with seismic and geologic hazards, flooding, wildfire, and hazardous materials (refer to Sections 4.10, Geology and Soils; 4.12, Hazards and Hazardous Materials; 4.13, Hydrology and Water Quality; and 4.19, Wildfire). As described in this EIR with the adoption of mitigation measures to address significant impacts and subsequently reduce these impacts to less–than–significant levels, this Proposed Project is

consistent with environmental and safety protection General Plan policies (Policy SAF–1.4 and SAF–4.4).

General Plan Land Use and Zoning Designation Consistency

As shown in Figure 4–14–1, the Proposed Project area lies primarily within the General Plan designation Timber, with limited areas of Resources Lands, Upland Agriculture, and Public.

While a hydroelectric plant is not listed as a permitted use in the Timber land use designation, the construction, operation, and maintenance of the project would have a minimal impact on timber resources. It would not significantly reduce the acreage available for timber production and therefore would not conflict with these land use designations. The allowance for a hydroelectric facility within Tehama County is covered under the County Code, as discussed below.

Tehama County Charter and Code – Required Permits

Pursuant to Section 17.70 – Use Permits, of the Tehama County Zoning Code, a Use Permit is required to authorize the construction and operation of the high voltage electrical facility (Tehama County Charter and Code 1984, Title 17 – Zoning). Rugraw submitted a Use Permit application in 2014. Tehama County deemed the application incomplete on February 21, 2014. One of the reasons for the incomplete application is that an adequate CEQA document must be completed. Processing and subsequent consideration of approval of the Use Permit application will require FERC's Final EIS and the State Water Board's Final EIR (Planning Department 2014).

In addition to a Use Permit, the Proposed Project will also require an Encroachment Permit pursuant to Tehama County Code Sections 15.02.310 – Permits and 16.50.030 – Encroachment Permit fee. Following approval of the Use Permit and prior to the start of Proposed Project construction, Rugraw is required to obtain a Building/Construction Permit and an Encroachment Permit from Tehama County. The Building/Construction Permit will ensure that the Proposed Project plans meet California Building Code Standards, and the Encroachment Permit will allow work to accommodate the transmission line located within Tehama County Road ROW/easements (Tehama County Charter and Code 1984).

While most of the Proposed Project is located in rural areas, the proposed new 60–kV transmission line would come within 300 feet of several rural homes and other buildings at the western end of the Proposed Project site. In these locations the line generally parallels existing roadways. To avoid and minimize effects on land uses, Rugraw proposes to delineate road and work areas prior to the start of construction and restrict Proposed Project activities to these areas and use existing roads to the maximum extent possible. Therefore, impacts would be less than significant and no mitigation measures related to land use and planning are required.

Construction, Operation, and Maintenance Impacts

- **Level of Significance:** Less Than Significant Impact
- **Mitigation Measures:** None required

4.14.5 References

Federal Energy Regulatory Commission (FERC). 2018. Final Environmental Impact Statement for Hydropower License: Lassen Lodge Hydroelectric Project—FERC Project No. 12496–002—California. Prepared by FERC, Washington, D.C.

Planning Department, Tehama County. 2014, February 21. U.P. #12–02, Application Determined To Be Incomplete.

Tehama County. 2009. Tehama County, General Plan Update, 2009–2029. Prepared by PMC, Chico, California. Retrieved from: www.co.tehama.ca.us

Tehama County. 1984. Tehama County Charter and Code. Retrieved from: library.municode.com

US Census Bureau. 2019. QuickFacts. Retrieved from: www.census.gov

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4.15 Noise

This section describes the regulatory framework and existing conditions related to the overall noise environment in the vicinity of the Proposed Project, evaluates noise and vibration impacts that could occur as a result of the Proposed Project, and details mitigation measures needed to reduce significant impacts, as necessary.

4.15.1 Terminology

Noise is defined as unwanted sound, and, above certain levels, is known to have several adverse effects on people, including hearing loss, speech and sleep interference, physiological responses, and annoyance. Although sound can be easily measured, the perception of noise and the physical response to sound complicate the analysis of its impact on people. People judge the relative magnitude of sound sensation in subjective terms such as “noisiness” or “loudness.”

The following are brief definitions of terminology used in this section:

- *Sound.* A disturbance created by a vibrating object, which, when transmitted by pressure waves through a medium such as air, is capable of being detected by a receiving mechanism, such as the human ear or a microphone.
- *Noise.* Sound that is loud, unpleasant, unexpected, or otherwise unwanted.
- *Decibel (dB).* A unit–less measure of sound on a logarithmic scale.
- *A–Weighted Decibel (dBA).* An overall frequency–weighted sound level in decibels that most closely resembles human hearing.
- *Peak particle velocity (PPV).* PPV refers to the movement within the ground of molecular particles and not surface movement. Ground vibration is measured in terms of PPV with units in inches per second.
- *Equivalent Continuous Noise Level (Leq).* Hourly equivalent continuous noise level or the average of all noise measured from 7 AM to 10 PM (daytime) and 10 PM to 7 AM (nighttime).
- *Day–Night Level (Ldn or DNL).* The average of the A–weighted sound levels occurring during a 24–hour period, with 10 dB added during the period from 10 PM to 7 AM. Because Ldn represents a 24–hour average, it tends to disguise short–term variations in the noise environment.
- *Community Noise Equivalent Level (CNEL).* Is similar to the Ldn, but with weighing factors placed on two time periods (7 AM to 10 PM, and 10 PM to 7 AM).
- *Sensitive Receptor.* Noise– and vibration–sensitive receptors include land uses where quiet environments are necessary for enjoyment and public health and safety. Residences, schools, motels and hotels, libraries, religious institutions, hospitals, and nursing homes are examples.

The general human response to changes in noise levels that are similar in frequency content are summarized as follows:

- A 3–dB change in sound level is considered to be a barely noticeable difference.
- A 5–dB change in sound level typically is noticeable.
- A 10–dB increase is considered to be a doubling in loudness.

When distance is the only factor considered, sound levels from an isolated noise source will typically decrease by about 6 dB for every doubling of distance from the source.

4.15.1.1 Corona Noise

Under certain conditions, the localized electric field near an energized conductor can be sufficiently concentrated to produce a small electric discharge that can ionize air close to the conductors. This partial discharge of electrical energy is called corona discharge or corona. Corona generates audible noise during operation of high–voltage transmission lines. Corona noise is generally more noticeable on high–voltage lines and is usually not an issue for power lines rated at 230 kV and lower.

4.15.1.2 Vibration

Generally speaking, vibration is energy transmitted in waves through the ground. Because energy is lost during the transfer of energy from one particle to another, vibratory energy is reduced with increasing distance from the source. Human perception of vibration varies with the individual and is a function of physical setting and the type of vibration. Persons exposed to elevated ambient vibration levels, such as people in an urban environment, may tolerate a higher vibration level. Groundborne vibration is almost never annoying to people who are outdoors; without the effects associated with the shaking of a building, the rumbling noise of vibrations is not perceptible.

4.15.2 Environmental Setting

Land uses near the Proposed Project are predominantly forestry, rural development, and open space. Within the Proposed Project area, land is mostly forested or shrub/scrub vegetation, with some areas of grassland, agricultural open space, and low intensity development. Existing sources of noise in the Proposed Project area include highway and road traffic, occasional aircraft, and agricultural operations. Given the low–density and rural, agricultural character of the Proposed Project vicinity, the ambient noise environment is expected to be generally quiet, ranging from 45–50 dBA (EPA, 1974).

4.15.2.1 Sensitive Receptors

The residents of Manton located on the western portion of the Proposed Project site would be considered sensitive receptors. The nearest residence is located immediately adjacent to the transmission line near Rolling Hills Road approximately 60 feet away. Other residences along South Powerhouse Road and Hazen Road are located within 200 feet of the transmission line route. The closest school, Manton Elementary, is approximately 0.6 mile north of the closest point of the transmission line. The town of Mineral would be closest to the eastern part of the Proposed Project at the diversion dam site, but no sensitive receptors are in close proximity. No

other sensitive receptors such as motels and hotels, libraries, religious institutions, hospitals, and nursing homes are in the vicinity of the Proposed Project.

4.15.3 Regulatory Setting

4.15.3.1 Federal

No federal regulations limit environmental noise related to construction activities.

4.15.3.2 State

General Plan Guidelines

The State of California, through its General Plan Guidelines, discusses how ambient noise should influence land use and development decisions and includes a table of normally acceptable, conditionally acceptable, normally unacceptable, and clearly unacceptable uses at different noise levels expressed in CNEL. A conditionally acceptable designation implies new construction or development should be undertaken only after a detailed analysis of the noise reduction requirements for each land use is made and needed noise insulation features are incorporated in the design. By comparison, a normally acceptable designation indicates that standard construction can occur with no special noise reduction requirements. Local municipalities adopt these compatibility standards as part of their General Plan and modify them as appropriate for their local environmental setting.

4.15.3.3 Local

Tehama County General Plan Noise Element

The Tehama County General Plan Noise Element provides a basis for comprehensive local policies to control and abate environmental noise and to protect the citizens of the County from excessive noise exposure. The following policies and implementation measures of the Noise Element are relevant to the Proposed Project:

- *Policy N–1.1:* The County shall require an acoustical analysis for new projects anticipated to generate excessive noise located adjacent, or near, to noise–sensitive land uses. The acoustical analysis shall be prepared in accordance with Table 9–5, Requirements for Acoustical Analysis Prepared in Tehama County.
  - *Implementation Measure N–1.1a:* Require site–specific noise analyses where noise generating land uses are proposed in proximity to sensitive noise sources such as residences, schools, nursing homes, hospitals, and day care centers. Noise mitigation shall be included and followed where the results of the analysis warrant such actions.
- *Policy N–2.4:* The County shall restrict construction activities to the hours as determined in the Countywide Noise Control Ordinance, if such an Ordinance is adopted.
  - *Implementation Measure N–2.4a*: Restrict construction activities to the hours as determined by the County's Noise Control Ordinance unless an exemption is received from the County to cover special circumstances. Special circumstances may include emergency operations, short–duration construction, etc.

- *Implementation Measure N–2.4b*: Require all internal combustion engines that are used in conjunction with construction activities be muffled according to the equipment manufacturer's requirements.

4.15.4 Analysis Methodology

4.15.4.1 Analytical Approach

Operation of the Proposed Project would involve up to four weekly vehicle trips for operations, with minimal effects on the noise environment. Maintenance activities would require up to 24 vehicle trips annually, over a 2– to 4–week period. With the low operation and maintenance needs of the Proposed Project, this noise and vibration analysis primarily focuses on construction–related impacts.

Noise

Evaluation of potential noise impacts from the Proposed Project included reviewing federal, state, and local noise standards and guidance. Tehama County does not have an adopted noise ordinance, and General Plan policies and implementation measures do not address short–term construction–related noise. For reference, the City of Red Bluff Zoning Ordinance, Article XXII, Prohibited Uses (H), provides that noise from construction or mechanical excavation in a residential district or within 100 feet of an occupied dwelling is prohibited between the hours of 7 PM and 7 AM.

Temporary construction noise associated with helicopter usage and aggregate operation of heavy equipment was evaluated using guidance from documents from California Department of Transportation (Caltrans), Federal Highway Administration (FHWA 2006), Federal Aviation Administration (FAA 2004) and the Federal Transit Administration (FTA 2006). The potential for noise related to operations and maintenance was also assessed.

Groundborne Vibration and Groundborne Noise

Caltrans has developed guidance on addressing groundborne vibration and groundborne noise associated with construction, operation, and maintenance of transportation projects. Operation of construction equipment and construction techniques, such as blasting and pile driving, generate ground vibration. Maintenance operations and traffic traveling on roadways can also be a source of such vibration. If its amplitudes are high enough, ground vibration has the potential to damage structures, cause cosmetic damage (e.g., crack plaster), or disrupt the operation of vibration–sensitive equipment, such as electron microscopes and research equipment. Traffic, including heavy trucks traveling on a highway, rarely generates vibration amplitudes high enough to cause structural or cosmetic damage. However, in most cases, vibration induced by typical construction equipment does not result in adverse effects on people or structures. Noise from the equipment typically overshadows any meaningful ground vibration effects on people. Some equipment, however, such as g vibratory rollers, can create high vibration levels (Caltrans, 2006, 2013).

The secondary effects of groundborne vibration, such as the movement of building floors, rattling of windows, and shaking of items on shelves or hanging on walls, can create rumbling sounds. The rumbling sound is caused by vibration of room surfaces and is called groundborne

noise. Groundborne noise can also be a source of annoyance to individuals who live or work close to vibration–generating activities.

Based on Caltrans guidance, transient or intermittent vibration sources are significant when the PPV exceeds 0.1 inch per second. Table 4.15–1 provides the human response to transient vibration. Though the guidance is non–enforceable, it provides a basis for evaluating potential vibration from the Proposed Project.

The area of assessment for both noise and vibration includes the area within the Proposed Project boundary, as well as an additional 1,000 feet outside the boundary.

Table 4.15–1. Human Response to Transient Vibration

Human Response	PPV
Severe	2.0 inches per second
Strongly perceptible	0.9 inch per second
Distinctly perceptible	0.24 inch per second
Barely perceptible	0.035 inch per second

Source: Caltrans 2013

4.15.4.2 Criteria for Determining Significance

Based on Appendix G of the 2020 CEQA Guidelines, the Proposed Project would have a noise impact if it would result in:

- Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local General Plan or noise ordinance, or in other applicable local, state, or federal standards;
- Generation of excessive groundborne vibration or groundborne noise levels; or
- For a project located within the vicinity of a private airstrip or 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, exposure of people residing or working in the project area to excessive noise levels.

4.15.5 Environmental Impacts and Mitigation

The Proposed Project does not include any environmental measures that specifically address noise–related impacts.

4.15.5.1 Impacts Related to Ambient Noise

IMPACT 4.15–1: Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local General Plan or noise ordinance, or in other applicable local, state, or federal standards?

Construction

Ambient noise levels would increase due to construction. Short–term noise effects would be caused by heavy equipment clearing and excavating, and by construction of each Proposed

Project facility, which includes use of a helicopter. Construction equipment would not generally be operated continuously, and equipment would not always be operated simultaneously. There would be times when no equipment is being operated and noise would be at ambient levels.

Table 4.15–2 shows the adjusted exterior sound levels for a typical workday during construction at various distances, covering the range of distances to nearby sensitive receptors in the Proposed Project area. These values were determined by applying usage factors for typical construction equipment sound levels. The usage factors (SDGE, 2014) account for the fact that equipment would not always be operated at full throttle and would not be used for an entire workday. However, when used to determine noise impacts, usage factors are applied irrespective of workday duration.

Table 4.15–2. Construction Exterior Sound Levels Adjusted for Workday Usage

Equipment	Adjusted Noise Level for Workday 50 feet	Adjusted Noise Level for Workday 100 feet	Adjusted Noise Level for Workday 200 feet	Adjusted Noise Level for Workday 500 feet	Adjusted Noise Level for Workday 1,000 feet
Air Compressor	73 dBA	67 dBA	61 dBA	53 dBA	46 dBA
Aerial Bucket Truck	73 dBA	67 dBA	61 dBA	53 dBA	46 dBA
Backhoe	76 dBA	70 dBA	64 dBA	56 dBA	49 dBA
Crane	76 dBA	70 dBA	64 dBA	56 dBA	49 dBA
Bulldozer	81 dBA	75 dBA	69 dBA	61 dBA	54 dBA
Drill Rig/Truck–mounted Augur	78 dBA	72 dBA	66 dBA	58 dBA	51 dBA
Grader	75 dBA	69 dBA	63 dBA	55 dBA	48 dBA
Mower	75 dBA	69 dBA	63 dBA	55 dBA	48 dBA
Portable Generator	70 dBA	64 dBA	58 dBA	50 dBA	43 dBA
Rock Drilling Machine	74 dBA	68 dBA	62 dBA	54 dBA	47 dBA
Truck	81 dBA	75 dBA	69 dBA	61 dBA	54 dBA
Wire Pulling Machine	74 dBA	68 dBA	62 dBA	54 dBA	47 dBA
Helicopter at Takeoff	90 dBA	NA	NA	NA	NA

Source: SDGE 2014

Notes: dBA – A–weighted decibel level
NA – not available

Construction noise impacts related to the diversion dam, penstock, powerhouse, switchyard, and substation are expected to be minor as no sensitive receptors are in close proximity to these Proposed Project facilities. However, the western portion of the transmission line is immediately adjacent to existing residences, which are considered sensitive receptors. Construction of the transmission line would involve heavy equipment such as those listed above, including helicopter use.

Existing logging roads would be used to access most of the transmission line route. Some portions of the transmission line that are not accessible by roads would be installed by

helicopter. These difficult to reach areas are within SPI–owned lands that have no adjacent sensitive receptors. No more than one helicopter would be in use at any one time. It is anticipated that the helicopter would refuel and be stored at Redding Airport, or another appropriately equipped local airport. Multi–purpose Area Number 2 near the Old Highway 36 Bridge would serve as the helicopter landing site during construction. Helicopter takeoff and landing would not affect sensitive receptors as there are none in the vicinity. Noise outside the Proposed Project area associated with takeoff, landings, and overflight would likely not be noticeable to sensitive receptors since the airports are active and already provide daily flights, and it is expected that helicopters would use established flight paths. In addition, helicopter use would be infrequent and only one helicopter would be in use at a given time.

The nearest residence is located immediately adjacent to the transmission line near Rolling Hills Road, approximately 60 feet away from the transmission line route. Other residences along South Powerhouse Road and Hazen Road are located within 200 feet of the transmission line route. No other sensitive receptors are in the Proposed Project area. Given the low–density and rural, agricultural character of the Proposed Project vicinity, the ambient noise environment is expected to be generally quiet, ranging from 45 to 50 dBA. During construction, residents near the transmission line would experience increased ambient noise levels ranging from 58 dBA to 81 dBA, depending on the equipment used. A 10–dB increase is considered to be a doubling in loudness.

Construction equipment would not be operated continuously or simultaneously and would occur during a relatively short duration from spring to late fall. Construction is proposed to occur between 7 AM and 7 PM Monday through Friday. Tehama County does not have an adopted noise ordinance, and General Plan policies and implementation measures do not address short–term construction–related noise. For reference, the City of Red Bluff Zoning Ordinance, Article XXII, Prohibited Uses (H), provides that noise from construction or mechanical excavation in a residential district or within 100 feet of an occupied dwelling is prohibited between the hours of 7 PM and 7 AM. Although temporary, the increased ambient noise levels would be considered a significant impact.

Operation and Maintenance

Operation and maintenance of the Proposed Project would not involve activities that would generate a permanent and substantial increase in noise levels. With the exception of the transmission line, all Proposed Project facilities are located well within SPI land and not near any sensitive receptors. Periodic use of access roads for Proposed Project operations would occur as needed and would typically involve up to four vehicle trips per week. Scheduled maintenance of the Proposed Project is not expected to occur every year. Typically, scheduled maintenance could involve up to 24 vehicle trips per week and would most likely occur in the fall, during a 2– to 4–week period. Periodic use of access roads for Proposed Project unscheduled maintenance would occur as needed and would typically occur over a few days. This slight periodic increase of vehicle trips would likely not be noticeable to sensitive receptors

The transmission line may generate corona noise, but the corona noise would be minimal and generally not noticeable because the line is 60 kV, much less than 230 kV, the level at which corona noise is typically detected. Thus, noise impacts from operation and maintenance of the Proposed Project would be less than significant.

Construction Impacts

Although of short duration, construction noise associated with the transmission line would be significant. To minimize construction–related short–term significant increases in noise levels the following mitigation measures are required. These measures would not eliminate noise level increases, but would minimize construction noise to the extent possible and alert residents so they may leave or avoid the area when construction is occurring. With implementation of these mitigation measures, impacts related to short–term increased ambient noise levels would be less than significant.

- **Level of Significance:** Less Than Significant with Mitigation Incorporated
- **Mitigation Measures:** The following mitigation measures[46] shall be applied to areas where construction takes place within 500 feet of nearby residences to minimize construction–related noise. This includes near Rolling Hills Road, Hazen Road, and South Powerhouse Road.
  - ***NOISE–1****: Implement General Noise Protection and Reduction Measures.* All noise producing equipment shall be equipped with noise control devices such as mufflers, in accordance with manufacturers' specifications and shall be maintained in proper operating condition. Equipment not in use shall not be left idling for more than five minutes.
  - ***NOISE–2****: Limit Period of Construction.* Proposed Project construction shall occur between the hours of 7 AM to 7 PM, Monday through Friday, with the exception of holidays (or otherwise established by Tehama County) when construction activities occur within 500 feet of residences.
  - ***NOISE–3****: Coordinate with Adjacent Residences.* At least one week prior to commencement of construction activities near residences, Rugraw's contractor shall provide written notification to residences identifying the type, duration, and frequency of construction operations. Notification materials shall also identify a mechanism for residents to register noise–related complaints with Tehama County, which generally considers noise–related concerns on a case–by–case basis.

Significance after Mitigation

Implementation of this measure would reduce ambient noise impacts to a less–than–significant level.

Operation and Maintenance Impacts

- **Level of Significance:** Less Than Significant Impact
- **Mitigation Measures:** None required

[46] Although Mitigation Measures NOISE–1, NOISE–2, and NOISE–3 fall outside the purview of the State Water Board, Rugraw has agreed to implement these measures.

4.15.5.2 Impacts Related to Groundborne Vibration and Noise

IMPACT 4.15–2: Generation of excessive groundborne vibration or groundborne noise levels?

Construction

Construction vibration related to the diversion dam, penstock, powerhouse, switchyard, and substation is expected to be minor since no sensitive receptors are in close proximity to these Proposed Project facilities. However, as previously discussed, the western portion of the transmission line is immediately adjacent to existing residences. The nearest residence is approximately 60 feet from the transmission line route.

Construction equipment generates vibrations that spread through the ground and diminish in amplitude with distance from the source. Construction activities can result in varying degrees of ground vibration, depending on the equipment and methods used, distance to the affected structures, and soil type. The generation of vibration can range from no perceptible effects at the lowest vibration levels, to low rumbling and perceptible vibrations at moderate levels (e.g., rattling windows), to slight damage at the highest levels (e.g., cracked plater). Vibration is typically noticed nearby when objects in a building generate noise from rattling windows or picture frames. This is known as groundborne noise. It is typically not perceptible outdoors and, therefore, impacts are normally based on the distance to the nearest building.

As shown in Table 4.15–3, the vibration level at 50 feet for a large bulldozer has a 0.031 PPV. Based on Caltrans guidance, continuous/frequent intermittent vibration sources are significant when the PPV exceeds 0.1 inch per second (0.1 PPV). Based on the Federal Transit Administration's Transit Noise and Vibration Impact Assessment (FTA, 2006), vibration levels of other typical construction equipment such as drilling, which would be used at the Proposed Project site, fall below 0.089 PPV at 25 feet. These levels are considered barely perceptible and are well below the level at which architectural damage typically occurs for residential structures. Therefore, construction–related vibration impacts would be less than significant.

Table 4.15–3. Typical Levels of Groundborne Vibration

Equipment Item[a]	Reference Vibration PPV at 25 Feet (Inch per Second)	PPV[b] at Receiver Distance at 50 Feet	PPV at Receiver Distance at 90 Feet	PPV at Receiver Distance at 100 Feet	PPV at Receiver Distance at 200 Feet
Large Bulldozer/Excavator	0.089 PPV	0.031 PPV	0.013 PPV	0.011 PPV	0.004 PPV
Loaded Trucks	0.076 PPV	0.027 PPV	0.011 PPV	0.010 PPV	0.003 PPV
Jackhammer	0.035 PPV	0.012 PPV	0.005 PPV	0.004 PPV	0.002 PPV
Small Bulldozer	0.003 PPV	0.001 PPV	less than 0.000 PPV	less than 0.000 PPV	less than 0.000 PPV

Source: FTA, 2006

Note: Based on the FTA *Transit Noise and Vibration Impact Assessment* (FTA, 2006), vibration levels of other typical construction equipment such as drilling, which would be used at the Proposed Project site, fall below 0.089 PPV at 25 feet. These levels are considered barely perceptible.

[a] Some items may be employed on the construction site that are not listed in this table (i.e., excavator, backhoe). The vibration levels produced by such items are estimated to be comparable to the items in the table (i.e., excavator levels comparable to large bulldozer, backhoe levels comparable to loaded trucks).

[b] For architectural damage (e.g., cracked plastered walls and ceilings) due to vibration, a Peak Particle Velocity (PPV) of 0.2 inch per second is considered the maximum vibration level for non–engineered timber and masonry buildings (typically applied to residential structures).

Operation and Maintenance

During operations and maintenance, the Proposed Project would not utilize equipment that could generate substantial levels of long–term groundborne vibration levels. In addition, there are no Proposed Project facilities located near sensitive receptors or structures that could be affected by vibration related to operation and maintenance activities. Therefore, vibration from on–site sources would be less than significant.

Impacts related to the generation of excessive groundborne vibration or groundborne noise levels would be considered less than significant.

Construction Impacts

- **Level of Significance:** Less Than Significant Impact
- **Mitigation Measures:** None required

Operation and Maintenance Impacts

- **Level of Significance:** Less Than Significant Impact
- **Mitigation Measures:** None required

4.15.5.3 Impacts Related to Airports

IMPACT 4.15–3: For a project located within the vicinity of a private airstrip or 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, would the project expose people residing or working in the project area to excessive noise levels?

Construction, Operation, and Maintenance

The Double Creek Ranch Airport, the nearest private airstrip, is located approximately 1.5 miles north of the closest point of the transmission line. The Double Creek Ranch Airport does not have an airport land use plan. The nearest public airport, Shingletown Airport, is located approximately 7 miles north of the transmission line. The regional airport, Redding Airport, is located approximately 30 miles from the transmission line.

While operations at Double Creek Ranch Airport may at times be audible at the Proposed Project site, the relatively limited and sporadic use of this airport for corporate travel or other limited uses, coupled with the distance between it and the Proposed Project site, would result in negligible amounts of noise at the Proposed Project site. As such, people working at the Proposed Project site would not be exposed to excessive noise levels from aircraft approaching or departing from the private aircraft using this facility. No impact would occur.

Construction, Operation, and Maintenance Impacts

- **Level of Significance:** No Impact
- **Mitigation Measures:** None required

4.15.6 References

California Department of Transportation (Caltrans). 2006. Transportation– and Construction–Induced Vibration Guidance Manual. Noise, Vibration, and Hazardous Waste Management Office.

Caltrans. 2013. Transportation and Construction Vibration Guidance Manual. Report CT–HWANP–RT–13–069.25.3.

Environmental Protection Agency (EPA). 1974. archive.epa.gov

Federal Aviation Administration (FAA). 2004. Report to Congress, Nonmilitary Helicopter Urban Noise Study. December 2004.

Federal Highway Administration (FHWA). 2006. FHWA Roadway Construction Noise Model User's Guide.

Federal Transit Administration (FTA). 2006. Transit Noise and Vibration Impact Assessment. FTA–VA–90–1003–06.

Pacific Gas & Electric Company (PG&E). 2019. Proponents Environmental Assessment Humboldt Bay–Humboldt #1 60 kV Reconductoring. February 2019.

San Diego Gas & Electric Company (SDGE). 2014. Proponents Environmental Assessment (Part A) for the Sycamore to Penasquitos 230 kV Transmission Line Project. April.

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4.16 Recreation

This section provides a description of recreation opportunities and recreational use in the Proposed Project area and evaluates potential impacts to recreational resources associated with construction, operation, and maintenance of the Proposed Project. The analysis is based on the review of existing resources, and applicable laws and regulations.

4.16.1 Environmental Setting

4.16.1.1 Regional Setting

In Tehama County, Lassen National Forest is the closest recreational resource to the Proposed Project area, located immediately adjacent to the east side of the Proposed Project. The southwestern entrance to Lassen Volcanic National Park is in nearby Mineral. Visitors heading to Lassen National Forest enter off SR 36. Two state parks are also within Tehama County including the William B. Ide Adobe State Historic Park and the Woodson Bridge State Recreation Area. In addition, the County provides three wildlife areas including Battle Creek Wildlife Area, Merrill's Landing Wildlife Area, and the Tehama Wildlife Area, as well as two ecological preserves including Butler Slough Ecological Reserve and Dales Lake Ecological Reserve. Interspersed US Department of the Interior, Bureau of Land Management (BLM) parcels are located in the Proposed Project vicinity, but these sites are not open to the public (FERC, 2018).

The closest designated recreation site to the Proposed Project is Battle Creek Campground, about 1.5 miles upstream of the diversion dam site. Lassen National Forest operates the 50–unit campground. The public land fronting South Fork Battle Creek is limited to a few hundred feet at the campground; adjacent land upstream is closed to public use. South Fork Battle Creek is stocked with hatchery trout at the confluence of South Fork and Cold Creek, located immediately upstream of the proposed diversion dam site. The area provides primitive camping.

Along South Fork Battle Creek, the closest sites commonly used for whitewater rafting are about 2.5 miles downstream of the proposed powerhouse. That stretch of South Fork Battle Creek is 11.5 miles long and is rated as a class II–V (V+) section by American Whitewater (FERC, 2018).

Visitation

Total visitation at nearby Lassen Volcanic National Park was 536,068 persons in 2016, with 85 percent of those visits occurring from June to October. Lassen National Forest, which also operates the nearby Battle Creek Campground, had an estimated 323,000 visitors in 2015; approximately 22 percent of those visitors stayed overnight, and 2 percent of those visitors traveled to remote wilderness areas. The Forest Service's information page for Battle Creek Campground reports that the campground has heavy usage with 50 designated sites and a maximum of 8 people per site (FERC, 2018; National Park Service, 2017).

4.16.1.2 Existing Recreational Resources in the Proposed Project Area

No designated recreation sites or specific recreational land uses lie within the Proposed Project area or within 1 mile of Proposed Project facilities. The Proposed Project is located primarily on privately owned land (Sierra Pacific Industries [SPI]) that is leased in perpetuity to Rugraw, with all access roads to SPI land gated and locked. No overnight camping or fires are allowed on SPI

land. The timberlands are patrolled by SPI, and signage indicates that trespassers will be prosecuted (Rugraw, 2014).

4.16.2 Regulatory Setting

4.16.2.1 Federal

There are no federal regulations addressing changes to the environment that may affect recreational resources.

4.16.2.2 State

There are no state regulations addressing changes to the environment that may affect recreational resources.

4.16.2.3 Local

Tehama County

The 2009 Tehama County General Plan Open Space and Conservation Element contains policies and implementation measures intended to protect and enhance recreational resources:

- *GOAL OS–9:* To protect and enhance resource lands in the County for the continued benefit of agriculture, timber, grazing, recreation, wildlife habitat, and quality of life.
  - *Policy OS–9.2:* The County shall encourage protection of reasonable access to resource land areas when neither the integrity of the natural resource nor private property rights will be adversely affected. Closure shall not unreasonably deprive public and private enjoyment of previously accessible natural resources.
    - *Implementation Measure OS–9.2a*. Monitor the potential closures to the public of natural resource lands within the County. Encourage reasonable access be maintained, if at all possible, to these lands.
  - *Policy OS–9.4:* The County shall actively promote outdoor recreation opportunities such as agritourism, nature–tourism, and environmental learning tourism.
    - *Implementation Measure OS–9.4a*. Identify opportunities for outdoor recreation within the County and work with the Chamber of Commerce, Tehama Economic Development Council, Tri–County Economic Development Corporation, and local businesses to market and attract visitors.

4.16.3 Methodology

4.16.3.1 Analytical Approach

The focus of the assessment is on physical changes to the environment that may affect recreational resources.

4.16.3.2 Criteria for Determining Significance

Based on Appendix G of the 2020 CEQA Guidelines, an impact would occur as a result of a project if any of the following:

- 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
- Include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment?

4.16.4 Environmental Impacts and Mitigation

The Proposed Project does not include any environmental measures to address recreation–related impacts.

4.16.4.1 Impacts Related to Existing Recreational Facilities

IMPACT 4.16–1: 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?

Construction

Recreation visitors travel to nearby Lassen National Forest, Lassen Volcanic National Park, and Battle Creek Campground. During Proposed Project construction, travelers going to these nearby recreation sites may be temporarily impacted by increases in traffic along SR 36 (refer to Section 4.17, Transportation).

Temporary construction–related increases in population (up to 30 during the construction period) would be considered minor. This short–term and minimal increase in population would not cause deterioration of existing recreational facilities.

Additionally, the Proposed Project does not involve the closure or construction of neighborhood, regional parks, or other recreational facilities and is therefore not expected to cause a significant impact to existing neighborhood, regional parks, or other recreational facilities.

Operation and Maintenance

No formal recreational use occurs on Proposed Project lands. Although the Proposed Project area can attract informal recreation, such as fishing and hiking, there are no designated recreational resources within the area. Additionally, informal use of the Proposed Project area would be considered trespassing since it is privately owned. However, opportunities downstream of the Proposed Project for fishing and whitewater boating are present and would remain with operations.

Fishing

Water withdrawals for power generation would have minor effects on fishing that may occur in the bypass reach, which would also be provided with a minimum flow when the Proposed Project is operating (refer to Section 4.6, Biological Resources – Aquatic and Fisheries).

However, the Proposed Project would not typically operate from July through September each year (depending on actual rainfall), so it would not affect recreation during the peak season for the recreational uses common in the Proposed Project vicinity, such as fishing. CDFW stocks hatchery trout at the intersection of South Fork Battle Creek and Cold Creek. CDFW staff have indicated there are no plans to change the location unless anadromous fish reach the Proposed Project area.

Whitewater Boating

To address potential concerns of the boating community, Rugraw conducted a site visit with representatives of local recreational organizations, FERC, SPI, and CDFW. During the site visit, all parties agreed the opportunities for whitewater rafting were marginal at best in the immediate Proposed Project area (FERC, 2018). To confirm, Rugraw conducted a feasibility study of whitewater rafting in the Proposed Project reach (Rugraw, 2014; Dimick, 1999), which concluded that this reach seldom has sufficient water for whitewater kayaking, and is potentially only navigable by expert kayakers capable of running "extreme whitewater" around log jams, boulder sieves, and braided channels. Hazardous conditions, including insufficient water flow and the lack of public access, were the primary reasons for the lack of whitewater rafting opportunities. In addition, the feasibility study was sent to American Whitewater and Shasta Paddlers with a request to identify any questions or concerns. None were received.

Proposed Project operation would not affect fishing during the peak season and would provide a minimum flow in the bypass reach when operating. Proposed Project operation would not substantially affect the downstream boating reach because all diverted flows would be returned to the South Fork at the powerhouse. Although some flow fluctuations could occur at the powerhouse during start–up and shut–downs, those fluctuations would be short–term and minor and would not be evident downstream of the powerhouse. As described above there is limited potential for whitewater boating in the Proposed Project reach. Therefore, fishing and whitewater boating would not be substantially affected by Proposed Project operations. In addition, since the Proposed Project would not disrupt, remove, or otherwise change recreational resources, it would not be inconsistent with the Tehama County General Plan regarding protection of recreational resources.

Therefore, impacts related to existing recreational facilities would be less than significant.

Construction Impacts

- **Level of Significance:** Less Than Significant Impact
- **Mitigation Measures:** None required

Operation and Maintenance Impacts

- **Level of Significance:** Less Than Significant Impact
- **Mitigation Measures**: None required

4.16.4.2 Impacts Related to Physical Environmental Effects

IMPACT 4.16–2: Include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment?

Construction, Operation, and Maintenance

The Proposed Project does not propose any recreational uses and would not generate a substantial amount of population resulting in the need for the construction or expansion of recreational facilities. Temporary construction–related increases in population (up to 30 during the construction period) and the addition of three permanent personnel to maintain and operate the Proposed Project would be considered minor. Therefore, impacts would be less than significant.

Construction, Operation, and Maintenance Impacts

- **Level of Significance:** Less Than Significant Impact
- **Mitigation Measures:** None required.

4.16.5 References

Dimick, R. 1999. Whitewater Boating Resource Study. Prepared for Rugraw, LLC. Redding, California. July 1999.

Federal Energy Regulatory Commission (FERC). 2018. Final Environmental Impact Statement for Hydropower License, Lassen Lodge Hydroelectric Project, FERC Project No. 12496–002. California. July.

Rugraw, LLC (Rugraw). 2014. FERC Application for License, Lassen Lodge Hydroelectric Project, Exhibit E – Environmental Report.

Tehama County. 2009. Tehama County General Plan. March 2009. Found at: www.co.tehama.ca.us

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4.17 Transportation and Traffic

This section describes laws and policies relevant to the CEQA review process for transportation. These policies provide a context for the impact discussion related to the Proposed Project's consistency with the applicable regulatory conditions. This section also describes the existing conditions related to transportation in the vicinity of the Proposed Project, evaluates transportation impacts that could occur as a result of the Proposed Project, and details mitigation measures needed to reduce significant impacts, as necessary.

4.17.1 Environmental Setting

4.17.1.1 Roadways

As stated in the Tehama County General Plan Transportation and Circulation Element, Interstate 5 (I–5) and State Routes (SR) 99 and 36 are the primary transportation routes through the County and provide access to a large number of the developed urban and rural areas in the County.

Other County arterial, collector, and local roads, as well as private roads, constitute the remainder of the County's roadway system. Some of these roads are considered "essential roadways", which are defined by the County as roads that function primarily as local and intra–regional routes providing localized access and connections to the major regional roads. No "essential roadways" are located within the Proposed Project area. The following roadways would be utilized by the Proposed Project.

Interstate–5

I–5 is the backbone of the region's transportation network. It is designated by the Federal Highway Administration (FHA) as a Major Freight Corridor. I–5 dissects the middle of Tehama County, connecting the cities of Corning and Red Bluff. The 2016 average annual daily traffic volumes (AADT) at I–5/SR 36 was 40,200 (Tehama County RTP, 2019).

State Route 36

Access to SR 36 is primarily provided by I–5. SR 36 east of Red Bluff provides access to Lake Almanor, Lassen Volcanic National Park, and the City of Susanville. AADT volumes on SR 36 is highest in Tehama County on the segment of roadway that runs through the City of Red Bluff at nearly 20,000 vehicles per day. Segments of SR 36 closest to the Proposed Project area are SR 36/Manton Road and SR 36/SR 89 with 2016 AADT volumes of 1,100 and 6,450, respectively (Tehama County RTP, 2019).

State Route 89

SR 89 traverses northwest through Tehama County and Lassen Volcanic National Park, and eventually terminates at the intersection with I–5 in Siskiyou County near the base of Mount Shasta. SR 89 accommodates up to nearly 17,000 vehicles per day in some segments, but has low travel rates within Tehama County. The 2016 AADT volumes at SR 89/SR 36 was 410 (Tehama County RTP, 2019).

4.17.1.2 Vehicle Miles Traveled

Reducing vehicle miles traveled (VMT) has become one of the top priorities for local and State agencies involved in transportation in alignment with the state and federal legislation setting goals for greenhouse gas reductions. Although the daily vehicle mileages for the cities of Red Bluff, Corning, and Tehama have decreased between 5 percent and 25 percent between 2010 and 2016, the County–wide daily vehicle mileage has increased by 7.5 percent during the same time period (Tehama County RTP, 2019). This indicates that in–town driving has decreased, but commuting has increased between communities within and outside of Tehama County.

4.17.1.3 Highway Truck Traffic

The majority of truck traffic in Tehama County occurs on I–5 and SR 99. Total truck traffic ranges from 1.0 percent to 18 percent of total vehicle traffic on Tehama County roadways. I–5 had a 2016 truck AADT of 6,500. The 2016 truck AADT for SR 36 and SR 89 was 380 and 4, respectively (Tehama County RTP, 2019).

4.17.1.4 Collisions

A 5–year summary of collisions on federal and state routes is provided in the RTP; 74 percent of total collisions and 93 percent of fatal collisions occurred in the unincorporated regions of the County. Collisions peaked in 2015 with 300 total collisions and 18 fatal collisions. In 2017, the total number of collisions dropped to 272, and fatal collisions dropped to 12. Bicycle and pedestrian collisions were centered in the incorporated cities of Red Bluff, Corning, and Tehama.

4.17.1.5 Bicycle and Pedestrian Facilities

There are no sidewalks on any of the roadways near the Proposed Project site. Pedestrians and bicyclists may utilize roadways in the Proposed Project area, but there are no designated facilities.

4.17.1.6 Public Transit

There are no public transit stops near the Proposed Project site.

4.17.2 Air Traffic

The Double Creek Ranch Airport is the nearest private airstrip located approximately 1.5 miles north of the closest point of the transmission line. It has a maximum runway length of 3,400 feet (AirChartGuide.com, 2020). The nearest public airport is Shingletown Airport located approximately 7 miles from the transmission line with the longest runway at 2,300 feet (AirCharterGuide.com, 2020).

4.17.3 Regulatory Setting

4.17.3.1 Federal

Aviation Regulations

The FAA regulates the safe use and preservation of navigable airspace. The FAA must be notified of any structures located in the airspace of an airport as defined below, or new structures taller than 200 feet in height, to confirm that the proposed structures will not pose a threat to safety.

- 14 CFR 77.13(2)(i) requires an applicant to notify the FAA of the construction of structures within 20,000 feet of the nearest point of the nearest runway of an airport with at least one runway longer than 3,200 feet.
- 14 CFR 77.17 requires an applicant to submit a Notice of Proposed Construction or Alteration (FAA Form Number 7460–1) to the FAA for construction within 20,000 feet of the nearest runway of an airport with at least one runway longer than 3,200 feet.
- 14 CFR 77.21, 77.23, and 77.25 outline the criteria used by the FAA to determine whether an obstruction would create an air navigation conflict.

4.17.3.2 State

California Department of Transportation (Caltrans) is the administrating agency for regulations related to traffic safety, including the licensing of drivers, weight and load limitations, transportation of hazardous and combustible materials, and the safe operation of vehicles.

4.17.3.3 Local

Tehama County Regional Transportation Plan (RTP)

The RTP serves as the planning blueprint to guide transportation planning and investments in Tehama County involving local, state, and federal funding over the next twenty years. The RTP provides various goals, objectives, strategies, and policies related to the transportation system. The following are relevant to the Proposed Project:

- *OBJECTIVE 1.1:* Preserve the existing transportation system with a pavement condition index (PCI) of 68 or better.
- *Strategies*
  - Promote a Fix–it First policy when prioritizing projects.
  - Encourage local agencies to have a pavement management system.
  - Collect and maintain data on pavement conditions and performance.

Tehama County General Plan Transportation and Circulation Element

The Transportation and Circulation Element contains the following policies and implementation measures relevant to the Proposed Project:

- *Policy CIR–1.2:* The County shall utilize the development review process to ensure that non–level–of–service impacts, such as roadway safety impacts, are identified and addressed in conjunction with new development proposals.
  - *Implementation Measure CIR–1.2a*: In conjunction with the preparation of traffic studies to determine potential level of service impacts to existing County roadways from proposed projects, additional analysis may be required irrespective of level of service impacts, to determine if structural and/or safety hazards exist. Structural deficiencies and safety hazards shall be identified and appropriate measures shall be determined to mitigate and/or enhance the structural capacity and/or safety of the roadway.

  - *Implementation Measure CIR–1.2c*: Traffic studies shall address on– and offsite roadway conditions for both local and state routes and mitigation measures that are proposed to address all identified issues.

- *Policy CIR–1.3:* The County should maintain and upgrade existing roads, as feasible, to meet the needs of County residents, visitors, and through traffic.
  - *Implementation Measure CIR–1.3b:* In consideration of proposed and existing projects or operations that generate a substantial number of large trucks and/or heavy load vehicles, the County shall explore options for the adoption of a roadway tonnage fee or oversized load fee to insure that those projects or operations do not cause, or will adequately mitigate, significant deterioration of County roads.
- *Policy CIR–1.6:* The County shall continue to support traffic safety enforcement safety as a means of improving traffic, bicycle, and pedestrian safety.

4.17.4 Methodology

4.17.4.1 Analytical Approach

According to section 15002, subdivision(g) of the CEQA Guidelines, “a significant effect on the environment is defined as a substantial adverse change in the physical conditions which exist in the area affected by the Proposed Project.” As stated in section 15064, subdivision (b) of the CEQA Guidelines, the significance of an activity may vary with the setting. The potential significance of Proposed Project impacts related to transportation are evaluated against significance standards provided in Appendix G of the CEQA Guidelines.

Operation of the Proposed Project would involve up to four weekly vehicle trips for operations, up to 24 vehicle trips annually over a 2– to 4–week period. With the low operation and maintenance needs of the Proposed Project, this transportation analysis focuses on construction–related impacts.

4.17.4.2 Criteria for Determining Significance

Based on Appendix G of the 2020 CEQA Guidelines, the Proposed Project would have a transportation impact if it would:

- Conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities;
- Conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b);
- Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment); or
- Result in inadequate emergency access.
- Environmental Impacts and Mitigation

The Proposed Project does not include any environmental measures to specifically address transportation–related impacts.

4.17.5 Environmental Impacts and Mitigation

The Proposed Project does not include any environmental measures to address recreation–related impacts.

4.17.5.1 Impacts Related to Transportation Programs, Plans, Ordinances, and Policies

IMPACT 4.17–1: Conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities?

Construction

During Proposed Project construction, traffic would occur daily during the construction season. Construction will primarily occur between 7:00 AM and 7:00 PM Monday through Friday. The predominant onsite construction activities, and any work requiring excavation or grading, would take place in the later spring, summer, and early fall, between approximately April 15 and October 15. In addition, onsite work on the turbine/generator and electrical and transmission systems may be year–round, but the majority of the site work would be accomplished in the April 15 to October 15 period. A summary of Table 2–2, Proposed Project Areas and Proposed Project Vehicles and Access Road Travel/Trips During Construction (Chapter 2, Proposed Project Description), is provided below:

Proposed Project Area	Number of Trips [a]
Substation/Point of Connection	24
Transmission Line	188
Powerhouse [b]	1,404
Total	1,616

a. Includes trips associated with construction crew carpools.

b. This area includes the diversion, pipeline, penstock, and transition structure.

To be conservative for the purposes of this analysis, it is assumed all construction activity would occur during the 6–month construction season (approximately 120 work days). This results in an average of approximately 14 trips per day. As noted above, segments of SR 36 closest to the Proposed Project area are SR 36/Manton Road and SR 36/SR 89 with 2016 AADT volumes of 1,100 and 6,450, respectively (Tehama County RTP, 2019). Construction–related trips represent a small fraction (approximately 0.01 percent or less) of the AADT on area roadways. In addition, the trips would be temporary and would be dispersed throughout the day and Proposed Project area. Proposed Project construction traffic is not expected to substantially degrade the existing level of service such that it would exceed County standards. Therefore, construction traffic impacts on area roadways would be less than significant.

***Roadway* Deterioration**

Use of local roadways by construction–related vehicles could contribute to deterioration of existing roadways, which would be in conflict with County policies. All access roads located on SPI land are currently and actively used and maintained by SPI for logging operations. PG&E actively uses and maintains easements for County roads (e.g., Ponderosa Way, Powerhouse

Road, Manton School Road, and Hazen Road) and private dirt roads for access to their existing transmission lines and to their South Powerhouse site. The County currently maintains South Powerhouse Road, Manton School Road, and Hazen Road. These paved roads are also currently and actively used by the local population, as well as logging trucks and PG&E. All of the roads within the Proposed Project area are also used by heavy emergency vehicles during forest fires and controlled burns.

These roads are designed to accommodate loaded logging trucks and logging equipment. The typical gross vehicle weight of loaded logging trucks is 80,000+ pounds, over twice the weight of Proposed Project construction vehicles, the heaviest of which is 29,000 pounds. Proposed Project vehicles and equipment that would utilize these roads would be under these weight limits and the weight design of the existing roads. Therefore, the Proposed Project would not result in deterioration of existing roadways and not be in conflict with County policies.

Operation and Maintenance

Periodic use of access roads for Proposed Project operations would occur as needed and would typically involve up to 4 vehicle trips per week by Proposed Project personnel. Periodic use for Proposed Project maintenance would occur as needed and would be of short duration, but relatively more intensive than operations access. Typically, regular maintenance could involve up to 24 vehicle trips per week by Proposed Project personnel and would occur most likely once a year in the fall, over a 2 to 4–week duration. Proposed Project maintenance is not likely to be required to occur every year. These trips are anticipated to be sporadic and nominal and would not affect the capacity of the roadway system. It is not expected that Proposed Project operation and maintenance traffic would substantially degrade the existing level of service such that it would exceed County standards. Therefore, impacts related to operation and maintenance on area roadways would be less than significant.

Pedestrian, Bicycle Facilities, and Public Transit

There are no sidewalks or bicycle facilities on any of the roadways in the Proposed Project area. No public transit routes operate near the Proposed Project site. Proposed Project construction, operation, and maintenance would generate a limited number of trips. Construction staging of equipment and materials would be located adjacent to the roadways and would not block any pedestrian or bicyclists. Therefore, there would be no impact with respect to bicycle or pedestrian facilities or public transit.

Construction, Operation, and Maintenance Impacts

- **Level of Significance:** Less Than Significant Impact
- **Mitigation Measures:** None required

4.17.5.2 Impacts Related to Automobile Delay

IMPACT 4.17–2: Conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b)?

Construction, Operation, and Maintenance

CEQA analysis of transportation impacts is based on the amount and distance that a project might cause people to drive, measured by automobile trips generated and trip distance (e.g., VMT). As stated in CEQA Guidelines section 15064.3, except as provided in subdivision (b)(2) (regarding roadway capacity), a project's effect on automobile delay shall not constitute a significant environmental impact. Automobile delay, as gaged by level of service or similar measures of capacity or traffic congestion, is therefore not considered a significant impact on the environment. The Proposed Project does not include uses that would substantially cause people to drive in the area. Construction–related traffic is not a consideration for determining impact significance under CEQA Guidelines section 15064.3.

Therefore, the Proposed Project would not result in conflicts or inconsistencies with CEQA Guidelines section 15064.3.

Construction, Operation, and Maintenance Impacts

- **Level of Significance:** Less Than Significant Impact
- **Mitigation Measures:** None required

4.17.5.3 Impacts Related to Design and Incompatible Use Hazards

IMPACT 4.17–3: Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?

Construction

Large trucks and construction equipment using local roads may pose a hazard to travelers and could contribute to increased numbers of accidents. Truck and equipment trips would be minimal and short–term during the construction period, but the temporary increase in traffic on some roads in the Proposed Project area could still contribute to significant impacts on public safety. Rugraw will acquire a building permit (Title 15 section 15.02.310 – Permits) and an encroachment permit (Title 16 section 16.50.030 – Encroachment permit fee) to address construction roadway work and any obstructions to flow of traffic (Tehama County Code and Charter 1984). Therefore, Construction impacts related to increased traffic would be less than significant.

Transmission Line

The Proposed Project does not include the construction or development of any transportation facilities with geometric design features. However, placement of the poles and towers with the use of a helicopter could temporarily conflict with aircraft from local airports. The Double Creek Ranch Airport is the nearest private airstrip located approximately 1.5 miles north of the closest

point of the transmission line. The nearest public airport is Shingletown Airport located approximately 7 miles from the transmission line. Based on FAA regulations, any structure that could obstruct airspace within 20,000 feet (or 3.8 miles) of an airport with at least one runway 3,200 feet in length, would require a permit.

Rugraw will obtain the appropriate FAA permit for construction and placement of the transmission line, poles, and towers to minimize potential conflicts with aircraft traffic in the area. In addition, Rugraw will also coordinate all Proposed Project helicopter operations with local airports before and during project construction[47]. Compliance of the appropriate FAA permits, during construction would address potential air traffic conflicts with new electrical facilities. Therefore, construction impacts related to the transmission line would be less than significant.

Operation and Maintenance

The Proposed Project does not include the development of any transportation facilities with geometric design features that could increase hazards. However, the presence of the transmission line could create a hazard or conflict with local flight operations. Compliance with the appropriate FAA permits, which address potential air traffic conflicts with new electrical facilities, would reduce the impact to less than significant.

Construction, Operation, and Maintenance Impacts

- **Level of Significance:** Less Than Significant Impact
- **Mitigation Measures:** None required

4.17.5.4 Impacts Related to Emergency Access

IMPACT 4.17–4: Result in inadequate emergency access?

Construction, Operation, and Maintenance

The Proposed Project would not involve any material changes to public streets, roads, or evacuation infrastructure. Although operation and maintenance of Proposed Project facilities would not substantially result in inadequate emergency access, construction activities could delay or impair emergency vehicle access and evacuation routes. Rugraw will acquire a building permit (Title 15 section 15.02.310 – Permits) and an encroachment permit (Title 16 section 16.50.030 – Encroachment permit fee) to address construction roadway work and any obstructions to flow of traffic (Tehama County Code and Charter 1984). Therefore, Construction impacts related to increased traffic would be less than significant.

Construction, Operation, and Maintenance Impacts

- **Level of Significance:** Less Than Significant Impact
- **Mitigation Measures:** None required

[47] Email correspondence between Rugraw and the State Water Board, dated September 7, 2020.

4.17.6 References

AirportGuide.com. 2020. CN42 Airport Runway Summary. Accessed at: airportguide.com

AirChartGuide.com. 2020. Shingletwon (0Q6) Airport Profile. Accessed at: www.aircharterguide.com

Tehama County. 2009. Tehama County General Plan. March 2009. Accessed at: www.co.tehama.ca.us

Tehama County. 2019. Tehama County Regional Transportation Plan. Adopted May 2019, with amendments April 2020. Accessed at: www.tehamacountypublicworks.ca.gov

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4.18 Tribal Cultural Resources

This section discusses potential impacts to Tribal Cultural Resources that could result from construction, operation, and maintenance of the Proposed Project. If necessary, mitigation measures are identified for significant impacts. Cultural resources are addressed in Section 4.7, Cultural Resources.

The impact analysis is based on information obtained through background research, as well as archaeological and architectural surveys conducted within the Proposed Project's Area Limit (PAL) as detailed in the report *Cultural Resources Inventory, Lassen Lodge Hydro Electric Project FERC License Number 12496, South Fork Battle Creek, Tehama County, California*, (Farrell et al., 2014, confidential filing), and the *Historic Properties Management Plan Lassen Lodge Hydro Electric Project FERC License Number 12496, South Fork Battle Creek, Tehama County, California* (Farrell et al., 2014, confidential filing).

The cultural resources work was conducted in consultation with FERC, Native American Heritage Commission (NAHC), local Native American tribes, State Historic Preservation Office (SHPO), and other interested parties.

4.18.1 Environmental Setting

The area surrounding the Proposed Project has a rich prehistory, ethnography, and history as part of the South Battle Creek region. The general context below provides an understanding of the types, origin, and importance of cultural resources that have been documented in the vicinity of the Proposed Project.

4.18.1.1 Proposed Project Area Limits

As part of the National Historic Preservation Act (NHPA) Section 106 process, FERC must consider whether the issuance of an original license would affect any historic property within the Proposed Project's Area of Potential Effects (APE). The Proposed Project's APE was determined in consultation with the SHPO and includes the area where the Proposed Project could directly or indirectly cause alterations in the use or character of a historic property. Under CEQA, the PAL has a similar definition as the APE with regards to effects on historical resources, and in most projects the PAL and the APE cover an identical area. For the Proposed Project, the PAL and APE are identical and include the land within the Proposed Project boundary, plus areas outside the boundary where project operations may affect the character or use of historical resources or Tribal Cultural Resources (TCR). Currently, as there are no documented TCRs or other resources outside the Proposed Project boundary that may be affected by the Project, the PAL and APE are the same as the Proposed Project boundary. Figure 2–1, Proposed Project (Maps 1 through 16) shows this boundary.

The final NHPA Section 106 APE and the PAL for the Proposed Project was approved by the SHPO on November 15, 2015. The PAL is approximately 250–acres and includes all areas where Proposed Project activities would occur:

- Diversions and intake structure: (2 acres)
- Powerhouse: (3.5 acres)
- Transition structure: (1 acre)

- Multi–purpose areas: (3.2 acres)
- Potential tower location: (2.9 acres)
- 120 foot–wide by 12–mile–long transmission line: (174.5 acres)
- 120 foot–wide by 2.4–mile–long penstock and pipeline: (34.9 acres)
- 120–foot–wide by 0.4–mile–long station service line: (5.8 acres)
- Transmission line pulling areas

Additionally, the PAL includes the entire boundary of archaeological sites within the area of direct impacts, as well as any areas that could be indirectly affected by the Proposed Project. The vertical PAL mirrors the vertical APE and extends as much as 60 feet above the ground (for new poles) and 1 to 20 feet below the ground, depending on the activity.

4.18.1.2 Prehistoric Overview

The cultural prehistory for the southern Cascade foothills has been formulated based on the early archaeological investigations at Kinsley Cave (CA–TEH–1) and Payne Cave (CA–TEH–193) by Baumhoff (1955, 1957). The two–phase sequence (early–Kingsley Complex and later–Mill Creek Complex) developed by Baumhoff was later expanded and refined by Johnson and Theodoratus (1984), Greenway (1982), and Wiant (1981). These studies and subsequent analyses of materials recovered from multiple sites and rock shelters led to the development of a five–phase chronological sequence.

As further explained in *Section 4.8, Cultural Resources*, the five–phase sequence is comprised of the Deadman Complex, the Kingsley Complex, the Dye Creek Complex, the Mill Creek Complex, and the Proto–Historic Period (Ethnographic Yana). The five–phase sequence was succeeded by Historic Contact (circa 1845) and the Proto–Historic Period (circa 1846 to 1911). The Proto–Historic Period included traditional type artifacts fashioned from Euro–American introduced materials, such as metal and glass. Glass projectile points and scrapers as well as iron nail harpoon toggles, glass beads, and white porcelain trade beads are also part of the Proto–Historic Period. In addition several items are present including, small triangular serrated obsidian projectile points, slab metates, manos, hopper mortars, flat ended pestles, white spire–lopped *Olivella* shell beads, whole *Haliotis* shells, *Glycymeris* and *Dentelia* shell beads, clam shell discs, magnesite cylinders, wooden tubular pipes, large pine nut beads, and twined basketry characterize the Proto–Historic Period. Similar to the Mill Creek Complex, single–family structures 3 to 4 m in diameter covered with bark or brush, pitted boulder petroglyphs, and tightly–flexed burials are also noted for this period, though cremations.

4.18.1.3 Ethnohistoric Overview

The ethnographic region of the Hokan–speaking Yana and Yahi surrounds the Proposed Project area (Johnson, 1978; Kroeber, 1925). These people resided in the upper Sacramento Valley within the foothills of the eastern Cascade Range. Specifically, their territory extended along Deer and Rock Creeks to the south, the Pit River to the north, and along the upper reaches of the Montgomery, Crow, Battle, and Deer Creek watersheds to the east (Johnson, 1978; Kroeber, 1925). The western boundary of the Yana and Yahi is generally thought to be within the foothills to the east of the Sacramento River, but this is unverified. Sapir and Spier (1943) suggest that these groups may have held seasonal fishing locations along the banks of the

Sacramento River. Neighboring tribes included the Northern Maidu to the south, the Achumawi to the north, the Wintu to the west, and the Atsugewi and northeastern Maidu to the east. Relations between these tribes varied over time.

The Yahi were separated from the Yana based on linguistic differences. The Yana were further divided into three separate linguistic divisions of the Northern, the Central, and the Southern groups (Heizer and Elsasser, 1980:17; Johnson, 1978:361). The Proposed Project area is located within Southern Yana territory, which, as defined by Kroeber (1925:339), the Southern Yana territory extended south from Battle Creek to encompass the drainages associated with Payne and Antelope Creeks. The pre–contact populations of the Yana and Yahi are estimated between 1,100 and 3,000 individuals, with the Southern Yana group estimated to be approximately 500 to 800 individuals (Johnson, 1978; Johnson, 2003; Kroeber, 1925; Sapir and Spier, 1943).

Southern Yana and Yahi villages and campsites were located along drainages within the foothills and mountains of their territory. They inhabited natural caves and rock shelters as well as small wooden pole–framed supported and conical bark–covered huts that had circular depressed floors. They also constructed pole–supported huts with covers made from branches, brush, animal skins, or other suitable covering materials (Hamusek, 1988). The temporary camps utilized during excursions for resource procurement often utilized simple thatched summer and temporary structures (Johnson, 1978).

The hunting and gathering subsistence strategy of the Yana and the Yahi is referred to as the Foothill Model by Greenway (2004:125 to 127) who summarized Johnson's (1978, 2003) description. This strategy indicates that primary subsistence resources included those that were abundant within the foothills (e.g., acorn, deer, salmon, bulbs, and seeds). During the majority of the year, the Yana occupied their villages located below 3,000 feet in elevation. These villages contained several households, though at certain times of the year, particularly during the spring, smaller family units would venture out to smaller campsites to procure resources for several days at time. During the summer months (June – September), the Yana would move to high elevations in the mountains to collect plant resources.

A variation of this model, classified as the Alternative Model, was provided by Wiant in 1981. Whereas subsistence in the Foothill Model placed greater emphasis on deer, the Alternative Model emphasized salmon fishing and acorn gathering (Greenway, 2004). However, Greenway's research at Dead Man's Cave (CA–TEH–290) suggested that while these two subsistence models had some overlap, the Alternative Model's emphasis on salmon as a primary resource was not supported by the archaeological data.

4.18.2 Regulatory Setting

4.18.2.1 Federal

Section 106 of the National Historic Preservation Act of 1966

Section 106 of the NHPA (Section 106) requires that every federal agency "take into account" how each of its undertakings could affect historic properties. Historic properties are districts, sites, buildings, structures, traditional cultural properties (TCPs), and objects significant in American history, architecture, engineering, and culture that are eligible for or listed in the National Register of Historic Places (NRHP). Historic properties are resources listed on or eligible for listing on the

NRHP (36 C.F.R. § 800.16(l)(1)). A property may be listed in the NRHP if it meets criteria provided in the NRHP regulations (36 C.F.R. § 60.4). For more detailed discussion refer to Section 4.7, Cultural Resources.

Native American Heritage Commission and Tribal Consultation

Consultation is required with the NAHC, the local Native American community, the SHPO, and any persons or organizations that know and/or are interested in cultural resources (e.g., traditional use areas and places of traditional or cultural significance) that could be impacted or affected by the Proposed Project. The lead federal agency, FERC, directed Rugraw to consult with these entities on May 8, 2013. The following is a summary of that consultation provided by Rugraw.

This consultation was conducted under 18 C.F.R. sections 380.14 and 380.16, FERC regulations implementing NEPA; Executive Orders 13007, Indian Sacred Sites, and 13175, Consultation and Coordination with Indian Tribal Governments; and FERC's Policy Statement on Consultation with Indian Tribes (18 C.F.R. § 2.1c, Order Number 635). Initially, the NAHC was contacted on October 31, 2007, and at that time the NAHC did not identify any sacred lands within the Proposed Project vicinity. The NAHC provided a list of Native American Contacts: Tracy Edwards, Redding Rancheria; Barbara Murphy, Redding Rancheria; James Hayward, Redding Rancheria; and Kelli Hayward, Wintu Tribe of Northern California. Letters describing the Proposed Project and requesting additional information regarding Native American cultural sites within the area and requesting identification of Proposed Project concerns, were sent to each contact on November 8, 2007, followed by a phone call on November 23, 2007. No comments were received at that time.

On December 17, 2012, the NAHC was contacted to request an updated Sacred Lands file search for the Proposed Project study area and a list of Native American contacts. The NAHC responded on January 22, 2013, that no Native American Tribal Cultural Resources were identified by their search within the proposed APE or the identical PAL. A list of eight Native American contacts was also provided: Kyle Self, Greenville Rancheria of Maidu Indians; Clara LeCompte, Maidu Nation; Art Angle, Enterprise Rancheria of Maidu Indians; Glenda Nelson, Enterprise Rancheria of Maidu Indians; Tracy Edwards, Redding Rancheria; James Hayward Sr., Redding Rancheria; Jason Hart, Redding Rancheria; and Beverly Ogle, Maidu–Pit River–Astugewi.

On April 30, 2013, a letter and email were sent by Tetra Tech, on Rugraw's behalf, to each of the parties listed above describing the Proposed Project and requesting information regarding potential Native American Tribal Cultural Resources within the study area. Mr. Hayward of the Redding Rancheria contacted Tetra Tech to discuss potential cultural resources in the study area and his concerns regarding salmon in the creek. However, Mr. Hayward was unable to continue consultation regarding the Proposed Project and delegated the consultation to Ms. Beverly Ogle. Ms. Ogle contacted Tetra Tech on September 12, 2013, to discuss the project and concerns regarding cultural resources within Southern Yana territory and the APE/PAL.

Ms. Ogle and Ms. Farrell (Tetra Tech) conducted a field visit of the southern eastern portion of the PAL at SF Battle Creek on October 22, 2013. Prehistoric sites CA–TEH–595 and CA–THE–2497 and areas of the PAL accessible by road were visited. On December 2, 2013, Ms. Beverly Ogle and Ms. Farrell conducted a second field visit of the northwestern portion of

the APE (near Manton, California), along the access roads and transmission line corridor. Ms. Ogle noted that this area is highly sensitive for prehistoric resources and noted there were once village sites near the Manton area. Prehistoric sites CA–TEH–1358/H, CA–THE–1490, and CA–TEH–2495 and areas of the PAL accessible by road (e.g., Powerhouse Road, Manton School Road, Hazen Road, and Ponderosa Way) were visited. An expanded discussion regarding these field visits and consultations with Ms. Ogle are provided in the Proposed Project's Cultural Resources Inventory Report (Farrell et al., 2014) and the HPMP.

The HPMP was prepared in consultation with Ms. Ogle, Mr. Hayward, and Lacie Mile (Greenville Rancheria) and information, concerns, and discussions regarding treatment of specific archaeological sites is contained in Sections 1.5.2 and 3.1 of the HPMP Vol I. (Tetra Tech, 2015).

Historic Properties Management Plan

As a result of comments received from SHPO, Rugraw filed a Revised HPMP in November 2015 (Tetra Tech, 2015) to address current and future Proposed Project–related effects on eligible or potentially eligible cultural resources within Proposed Project's APE. The purpose of the HPMP is to provide specific requirements that would avoid, reduce, or mitigate cultural resources impacts. As stated in FERC's Final EIS (Section 5.1.2, Additional Measures Recommended by Staff, page 214), the Proposed Project includes finalizing the HPMP to include both California SHPO and FERC staff comments and recommendations. These revisions are described below under *Applicant's Proposed Measures*.

The HPMP includes the following topics that would guide Rugraw in applying both general and site–specific treatment measures:

- Confidentiality
- General and site–specific treatment measures designed to address effects to historic properties that may be a result of the Proposed Project's construction, operation, and maintenance
- A process of consultation with appropriate state and federal agencies, participating tribes, and stakeholders
- A plan for public interpretation and education
- Procedures to implement for inadvertent discoveries
- Procedure to implement for emergency situations
- Procedures for the treatment of human remains
- A process for HPMP review and revision (as necessary)

The HPMP acknowledges that future changes to specific site treatments may be required and that consultation at such times with FERC, California SHPO, Native American tribes, and others, as appropriate, would be necessary.

Programmatic Agreement

On July 10, 2019, FERC and SHPO approved the Final Programmatic Agreement (PA) for the Proposed Project. The PA identifies specific stipulations that must be implemented by Rugraw

as a condition of issuing a new license for the Proposed Project (FERC, 2019). Most importantly, these include:

- Revise the current HPMP in consultation with California SHPO, Native American tribes, and others, as appropriate, within one year of license issuance
- Procedures to amend the PA
- Coordination with other federal agency reviews

4.18.2.2 State

CEQA and Assembly Bill 52

Effective July 1, 2015, CEQA was revised to include early consultation with California Native American tribes and consideration of Tribal Cultural Resources (TCRs). These changes were enacted through Assembly Bill 52 (AB 52). By including TCRs early in the CEQA process, AB 52 intends to ensure that local and Tribal governments, public agencies, and project proponents would have information available, early in the project planning process, to identify and address potential adverse impacts to TCRs. CEQA now establishes that a "project with an effect that may cause a substantial adverse change in the significance of a TCR is a project that may have a significant effect on the environment." (PRC, section 21084.2.)

To help determine whether a project may have such an adverse effect, the PRC requires a lead agency to consult with any California Native American tribe that requests consultation and is traditionally and culturally affiliated with the geographic area of a proposed project. The consultation must take place prior to the determination of whether a negative declaration, mitigated negative declaration, or environmental impact report is required for a project. (PRC, section 21080.3.1.) Consultation must consist of the lead agency providing formal notification, in writing, to the tribes that have requested notification or proposed projects within their traditionally and culturally affiliated area.

If the tribe wishes to engage in consultation on the project, the tribe must respond to the lead agency within 30 days of receipt of the formal notification. Once the lead agency receives the tribe's request to consult, the lead agency must then begin the consultation process within 30 days.

The Notice of Preparation (NOP) for this Draft EIR was filed with the State Clearinghouse on February 10, 2015 (Number 2015022043), which was before the July 1, 2015, effective date of AB 52. Although AB52 consultation is not required for the Proposed Project given its CEQA process predates the passage of AB52, the State Water Board values and respects the knowledge and history of Native American tribes and has conducted environmental analysis of potential impacts to Tribal Cultural Resources as part of CEQA document development. Additionally, the State Water Board understands that Rugraw has consulted with the Native American tribes in the Proposed Project area through the Section 106 process, as described above. While this consultation did not result in the identification of a TCR, per the HPMP, there are procedures in place if TCRs are encountered during construction. If avoidance of a TCR is not feasible, then the HPMP includes actions to reduce the impact to a less–than–significant level.

4.18.3 Analysis Methodology

Under existing law, environmental documents must not include information about the locations of an archaeological site or sacred lands or any other information that is exempt from public disclosure pursuant to the Public Records Act. TCRs are also exempt from disclosure. CEQA defines the term "tribal cultural resource" as either of the following:

(1) Sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe that are either of the following:

(A) Included or determined to be eligible for inclusion in the California Register of Historical Resources.

(B) Included in a local register of historical resources as defined in subdivision (k) of [Public Resources Code] Section 5020.1.

(2) 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.

4.18.3.1 Criteria for Determining Significance

Based on Appendix G of the 2020 CEQA Guidelines, a project would have an impact on tribal resource if it would:

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.

4.18.4 Applicant's Proposed Measures

An HPMP was developed during the FERC licensing process and is required to be implemented. As stated in FERC's Final EIS (Section 5.1.2, Additional Measures Recommended by Staff, page 214), the Proposed Project includes finalizing the HPMP, to include both California SHPO and FERC staff comments and recommendations. Revisions to the HPMP will include: (1) modifying specific sections, and appendix B of the document for a clearer and more concise management approach for historic properties that may be affected by the Proposed Project; (2) copies of any post–2014 tribal correspondence and consultation related to the identification of cultural resources and development of the HPMP to document full compliance with section 106 of the NHPA; (3) a cultural resources interpretive element, such as installation of public interpretive signs at key viewing areas; (4) a detailed monitoring plan for cultural resources within the APE that are eligible for listing in the National Register or have not

yet been evaluated; (5) provisions for periodic review and revision of the HPMP; (6) editorial corrections as specified in the EIS; and (7) inclusion of Volume II into the Final HPMP.

The HPMP requires the periodic assessment of information regarding management effectiveness. The HPMP requires Rugraw or its designee to prepare an annual report summarizing all cultural resource related activities conducted during construction and/or operation and maintenance of the Proposed Project for each year. Rugraw will submit the report to the SHPO, participating tribal representative(s)[48] (i.e., members of the tribes who have requested consultation and wish to receive these reports), and FERC by December 31 of every year, for the duration of the license. If impacts to cultural resources are identified, the annual report will disclose those impacts, assess whether those impacts are a result of construction or operation and maintenance related to the Proposed Project, whether or not the impacts may have an effect on historic properties in consultation with the appropriate parties, and recommend further action, if necessary.

Key aspects of the HPMP are provided below:

- *Avoidance*. The Proposed Project will be designed to avoid all assumed eligible and eligible historic properties/resources identified within the PAL, as feasible. The Proposed Project proponent will ensure avoidance of assumed eligible and eligible historic resources through worker environmental training, fencing, monitoring, and other measures. Protocols for avoidance of impacts to historic properties are outlined in the HPMP and include avoidance, capping, and monitoring.
- *Resource Evaluations*. If any potentially eligible cultural resource or resource within the PAL cannot be avoided, it will be evaluated for NRHP and/or CRHR eligibility. If necessary to avoid adverse effects or significant impacts on the resource, additional treatments will be recommended for those resources recommended as or determined eligible. Treatments would include, but are not limited to, capping, data recovery, or other items as determined though consultation with SHPO, FERC, Native American tribes, and/or others as appropriate.
- *Worker Education/Training*. As outlined in the HPMP, prior to construction of the Proposed Project, all personnel will be briefed by an archaeologist meeting the Secretary of the Interior's Professional Qualification Standards for Archaeology about the prehistoric and historic archaeological resources within the PAL. In addition, the training will include a discussion on the importance of, and the legal basis for, the protection of archaeological resources. Personnel will be given a training brochure regarding identification of cultural resources and protocols for reporting finds. If applicable, all archaeological and any Native American monitors will be introduced to Proposed Project personnel and their roles explained.
- *Archaeological Monitoring*. As outlined in the HPMP, a Cultural Resource Monitoring Plan (CRMP) that outlines protocols and procedures will be developed (in consultation with SHPO, FERC, Native American tribes, and/or others as appropriate) prior to construction of the Proposed Project. In general, monitoring will take place in areas

[48] Currently participating tribes include the Maidu–Pit River–Atsugewi, Maidu Nation, Redding Rancheria, Greenville Rancheria, Enterprise Rancheria of Maidu Indians, and Wintu Tribe of Northern California.

containing sensitive resources and along the penstock PAL adjacent to South Battle Creek, near sites CA–TEH–595 and CA–TEH–2497. In addition, archaeological site CA–TEH–1358, CA–TEH–1824H, CA–TEH–1490, CA–TEH–2495 (near or within access roads) will be monitored by checking at random intervals. As a result of tribal consultation, Beverly Ogle, tribal elder with the Maidu–Pit River–Astugewi Tribe, has requested an Archaeological and Native American Monitor be present during project construction in sensitive areas. One monitor per earth–moving vehicle will be present. If any cultural resources are identified by the monitor(s) during ground disturbing activities, the resource will be treated as an unanticipated discovery and the protocols outlined in the CRMP will be followed.

- *Inadvertent Discoveries of Archaeological Resources*. An Inadvertent Discoveries Plan (IDP) has been prepared for the Proposed Project and is included as Appendix B of the HPMP. The IDP outlines procedures in the event of an inadvertent discovery. If the construction staff or others observe previously unidentified archaeological resources during construction, they will halt work within a 200–foot radius of the find(s), delineate the area of the find with flagging tape or rope (may also include dirt spoils from the find area), and immediately notify the Proposed Project Archaeologist. Construction will halt within the flagged or roped–off area. The Proposed Project Archaeologist will assess the resource as soon as possible and determine appropriate next steps in coordination with Rugraw and the SHPO (and Native American representatives, as necessary). Such finds will be formally recorded and evaluated. The resource will be protected from further disturbance or looting pending evaluation as defined in the HPMP.
- *Unanticipated and Inadvertent Discoveries of Human Remains*. The IDP (HPMP, Appendix B) outlines the procedures for inadvertent discovery of human remains. If human remains and/or cultural items defined by Health and Safety Code section 7050.5, are inadvertently discovered during construction activities, all work in the vicinity of the find will cease and the Tehama County Coroner will be contacted immediately. If the remains are found to be Native American as defined by Health and Safety Code section 7050.5, the coroner will contact the NAHC by telephone within 24 hours. The NAHC shall immediately notify the person it believes to be the Most Likely Descendant (MLD) as stipulated by California PRC section 5097.98. The MLD(s), with the permission of the landowner and/or authorized representative, shall inspect the site of the discovered remains and recommend treatment regarding the remains and any associated grave goods. The MLD shall complete their inspection and make their recommendations within 48 hours of notification by the NAHC. The CRMP that will be developed for the construction of the Proposed Project will outline the protocol and procedures for unanticipated and inadvertent discoveries of human remains.

4.18.5 Environmental Impacts and Mitigation

4.18.5.1 Impacts Related to Tribal Cultural Resources

IMPACT 4.18–1: Would the Proposed 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)

Construction, Operation, and Maintenance

No TCRs were identified during the visual survey or the record search; therefore, the Proposed Project is not anticipated to cause a substantial adverse change in the significance of a TCR listed or eligible for listing in the California Register of Historical Resources (CRHR), or in a local register of historic resources as defined in Public Resources Code section 5020.1(k). No impacts are anticipated due to the Proposed Project on archaeological resources; however, as with any project requiring ground disturbance, there is always the possibility that unmarked Tribal Cultural Resources may be unearthed during construction. This impact would be considered significant, as it could lead to the destruction of a site that could potentially be eligible for listing in the CRHR. However, compliance with Rugraw's Proposed Measures described in the HPMP will reduce any potential impacts on Tribal Cultural Resources to less than significant. These measures would allow for consultation with tribal representatives to determine if a newly discovered cultural resources is a TCR and require evaluation for potential inclusion in the CRHR. If the site is determined to be a TCR potentially eligible for inclusion in the CRHR, measures within the HPMP and future CRMP detail steps for reducing impacts that include, but are not limited to, avoidance and data recovery.

Construction, Operation, and Maintenance Impacts

- **Level of Significance:** Less Than Significant Impact
- **Mitigation Measures:** None required

(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.

Construction, Operation, and Maintenance

No TCRs were identified during the visual survey and record search; therefore, the Proposed Project is not anticipated to cause a substantial adverse change to a TCR pursuant to criteria set forth in subdivision (c) of Public Resources Code section 5024.1 related to archaeological

resources; however, as with any project requiring ground disturbance, there is always the possibility that unmarked cultural resources may be unearthed during construction. This impact would be considered significant. With implementation of the Final HPMP, the impact would be less than significant.

Construction, Operation, and Maintenance Impacts

- **Level of Significance:** Less Than Significant Impact
- **Mitigation Measures:** None required

4.18.6 References

Baumhoff, M.A. 1955. *Excavations of Site THE–1 (Kingsley Cave)*. University of California Archaeological Survey Reports 30:40–73.

Baumhoff, M.A. 1957. *An Introduction to Yana Archaeology.* University of California Archaeological Survey Report 40. Berkley.

Farrell, Jenna, Compas, Lynn, and Julia Mates. 2014. Cultural Resources Inventory Lassen Lodge Hydroelectric Project FERC License Number 12496 Tehama County, California. Available online: www.battle–creek.net (accessed April 2, 2020).

Greenway, Greg B. 1982. Projectile Point Variability at Deadman's Cave (CA–TEH–290) in the Southern Cascade Mountains of Northeastern California. Unpublished Master's Thesis, Department of Anthropology, California State University, Sacramento.

Hamusek, B. 1988. The Stratigraphy and Archaeology of CA–THE–1490: A Hunting Camp in Yana Territory, Northern, California. California Division of Forestry Reports Number 1. California Department of Forestry and Fire Protections, Sacramento, California (not seen as cited in Tetra Tech, 2015b).

Heizer, R.F., and A. Elsasser. 1980. The Natural World of the California Indians. University of California Press (California Natural History Guides:46).

Johnson, J.J. 1978. Yana. In: *Handbook of North American Indians,* Volume 8:361–369. Robert F. Heizer, ed. Smithsonian Institution, Washington, D.C.

Johnson, J.J. 2003. The Yahi and Southern Yana: An Example of Cultural Conservatism, Genetic Isolation, and an Impoverished Resource Base. *Proceedings of the Society for California Archaeology* 16:95–102.

Johnson, J.J., and D.J. Theodoratus. 1984. Cottonwood Creek Project, Shasta and Tehama Counties, California Dutch Gulch Lake, Intensive Cultural Resource Survey. Institute of Archaeology and Cultural Studies, Report Number1, California State University, Sacramento.

Kroeber, A.L. 1925. Handbook of the Indians of California. Bureau of American Ethnology Bulletin 78. Washington.

Lewis, H.T. 1990. Reconstructing patterns of Indian burning in southwestern Oregon. In: *Living with the land: the Indians of southwest Oregon*, Hannon, R.K. Olmo (eds.), p.80–84. Southwestern Oregon Historical Society, Ashland, Oregon.

Sapir, E., and L. Spier. 1943. Notes on the Culture of the Yana. *University of California Anthropological Records* 3(3):239–298.

Schultz, P.E. 1954. Indians of Lassen Volcanic National Park and Vicinity. Loomis Museum Associates, Red Bluff, California. United States.

Sundahl, Elaine. 2001. Archaeological Investigations at CA–TEH–1783, The Jelly Mound Site. On file at the Northeastern Information Center, Chico, California and at the Bureau of Land Management, Redding, California.

Tetra Tech. 2015. Final License Application Appendix J, Historic Properties Management Plan Lassen Lodge Hydroelectric Project FERC License Number 12396 South Fork Battle Creek Tehama County, California, Volumes I and II. November 10.

Watts, Diane C., and Michael A. Dugas. 1998. A Chronological Look at the Changing Pattern of Human Use in the Watersheds of Mill, Deer, and Antelope Creek. Appendix Q. In: *Watershed Analysis for Mill, Deer, and Antelope Creeks*. Prepared by the Almanor Ranger District, Lassen National Forest, Susanville, California.

Wiant, Wayne C. 1981. Southern Yana Subsistence and Settlement: An Ecological Model. Master's Thesis Department of Anthropology, California State University, Sacramento.

4.19 Wildfire

This section describes the regulatory framework and existing conditions related to wildfire hazards and risks in the vicinity of the Proposed Project, evaluates potential wildfire hazards and risks that could occur as a result of the Proposed Project, and details mitigation measures needed to reduce potentially significant impacts, as necessary.

4.19.1 Environmental Setting

4.19.1.1 Regional Setting

Most Proposed Project facilities are located on Sierra Pacific Industries (SPI) forested lands in a remote setting with minimal road and public access. This area of the Proposed Project is characterized by steep canyon walls incised by South Fork Battle Creek, with riparian and upland vegetation, including chaparral, hardwoods, and conifers.

The proposed 12–mile–long, 60 kilovolt (kV) transmission line would range in elevation from 3,470 feet at the generation substation climbing up to a maximum elevation of 4,422 feet then down to the low point of the transmission line at an elevation of approximately 2,105 feet where it would interconnect with the Pacific Gas and Electric Company (PG&E) Volta – South Transmission line in the town of Manton. The transmission line would traverse forested areas and open upland vegetated areas.

The Proposed Project area is located in a State Responsibility Area (SRA), for which CAL FIRE is financially responsible for wildland fire suppression and prevention. The severity of a wildfire hazard is determined by the relationship among three factors: fuel classification, topography, and critical fire weather frequency. CAL FIRE has identified the Proposed Project area as being in a Very High Fire Hazard Severity Zone (CAL FIRE, 2007), which is defined as an area at extreme risk for wildfires. Fires have occurred in the central and western portions of the Proposed Project area, most notably the Ponderosa Fire. This high–intensity fire burned extensive portions of the Proposed Project area in the summer of 2012. The fire was of such intensity in some areas that very few if any live standing trees or shrubs remained, and the understory was burned down to mineral soil (Rugraw, 2014).

4.19.2 Regulatory Setting

4.19.2.1 Federal

There are no federal regulations specific to wildfire applicable to the Proposed Project.

4.19.2.2 State

California Building Code (California Code of Regulations, Title 24, Part 2) Chapter 7A

Chapter 7A of the California Building Code (CBC), Materials and Methods for Exterior Wildfire Exposure, prescribes building materials and construction methods for new buildings in a Fire Hazard Severity Zone (FHSZ). Chapter 7A contains requirements for roofing; attic ventilation; exterior walls; exterior windows and glazing; exterior doors; decking; protection of underfloor, appendages, and floor projections; and ancillary structures. The CBC is updated on a three–year cycle; the current 2019 CBC took effect in January 2020.

California Fire Code

The California Fire Code (CFC) is Part 9 of Title 24 of the California Code of Regulations. The CFC includes provisions and standards for emergency planning and preparedness, fire service features, fire protection systems, hazardous materials, fire flow requirements, fire hydrant locations and distribution, and the clearance of debris and vegetation within a prescribed distance from occupied structures in wildfire hazard areas.

Chapter 49 of the CFC, Requirements for Wildland–Urban Interface Fire Areas, prescribes construction materials and methods in fire hazard severity zones; requirements generally parallel those of CBC Chapter 7A.

Public Resources Code

Public Resources Code (PRC) sections 4291 et seq. require that brush, flammable vegetation, or combustible growth within 100 feet of buildings be removed. Vegetation that is more than 30 feet from the building, less than 18 inches high, and important for soil stability may be maintained; as may single specimens of trees or other vegetation that is maintained so as to manage fuels and not form a means of rapid fire transmission from other nearby vegetation to a structure. Requirements regarding hazardous vegetation and fuel management are contained in sections 4906 and 4907 of the California Fire Code.

PRC section 4290 requires the State Board of Forestry and Fire Protection (CAL FIRE) to adopt regulations implementing minimum fire safety standards for defensible space that would be applicable to lands within the SRA and lands within very high FHSZs.

California Code of Regulations Title 14, Sections 1250 Et Seq.: Fire Prevention Standards for Electric Utilities

Title 14 of the California Code of Regulations, sections 1250 et seq. set forth fire prevention standards for electric utilities. Sections 1254 and 1256 provide the following requirements for vegetation clearance from poles, towers, and wires.

- *Section 1254:* The firebreak clearances required by PRC section 4292 are applicable within an imaginary cylindroidal space surrounding each pole or tower on which a switch, fuse, transformer or lightning arrester is attached and surrounding each dead end or corner pole unless such pole or tower is exempt from minimum clearance requirements by provisions of Title 14 of the California Code of Regulations, section 1255 or PRC section 4296. The radius of the cylindroid is 3.1 meters (10 feet) measured horizontally from the outer circumference of the specified pole or tower with height equal to the distance from the intersection of the imaginary vertical exterior surface of the cylindroid with the ground to an intersection with a horizontal plane passing through the highest point at which a conductor is attached to such pole or tower. Flammable vegetation and materials located wholly or partially within the firebreak space shall be treated as follows:
    a. At ground level; remove flammable materials, including but not limited to, ground litter, duff and dead or desiccated vegetation that will allow fire to spread;
    b. From 0 to 2.4 meters (0 to 8 feet) above ground level; remove flammable trash, debris or other materials, grass, herbaceous, and brush vegetation. All limbs and foliage of living trees shall be removed up to a height of 2.4 meters (8 feet); and

c. From 2.4 meters (8 feet) to horizontal plane of highest point of conductor attachment; remove dead, diseased, or dying limbs and foliage from living sound trees and any dead, diseased, or dying trees in their entirety.

- *Section 1256*: Minimum clearance required by PRC section 4293 shall be maintained with the specified distances measured at a right angle to the conductor axis at any location outward throughout an arc of 360 degrees. Minimum clearance shall include:

    1. Any position through which the conductor may move, considering, among other things, the size and material of the conductor and its span length; and

    2. Any position through which the vegetation may sway, considering, among other things, the climatic conditions, including such things as foreseeable wind velocities and temperature, and location, height and species of the vegetation.

Senate Bill 901

In 2018, California enacted legislation requiring public utilities to develop and implement wildfire mitigation plans under Senate Bill (SB) 901. All electrical corporations, including Independent Transmission Operators (ITO) such as Rugraw, are required to submit a Wildfire Mitigation Plan (WMP) in compliance with this legislation and with direction from the CPUC (Rulemaking 18–10–007 updated December 16, 2019, as clarified December 23, 2019). Based on review of other ITO WMPs whose projects were not yet constructed, it is assumed that the CPUC expects the WMP to be implemented during all phases of a project, including initial construction, operation, and maintenance (CPUC, 2020).

The Proposed Project is located entirely within the CPUC Tier 2 “Elevated” High Fire Threat District (HFTD). Rugraw would be required to provide annual updates to focus on any adjustments, provide verification of activities, identify planned infrastructure changes, and reporting on actual outcomes (CPUC, 2019). The WMP is comprised of five sections detailing:

1. Persons responsible for executing the plan;
2. Metrics and underlying data;
3. Baseline ignition probability and wildfire risk exposure;
4. Inputs to the plan, including current and directional vision for wildfire risk exposure; and
5. Wildfire mitigation activity for each year of the 3–year WMP term, including expected outcomes of the 3–year plan.

The objectives of the WMP shall, at a minimum, be consistent with the requirements of Public Utilities Code section 8386, subdivision (a). This includes a description of utility WMP objectives, categorized by each of the following timeframes:

1. Before the upcoming wildfire season, as defined by CAL FIRE;
2. Before the next annual update;
3. Within the next 3 years; and
4. Within the next 10 years.

In addition, the CPUC provides guidance on describing how the utility's specific programs and initiatives are executed, based on the following categories (CPUC, 2019):

1. Risk assessment and mapping
2. Situational awareness and forecasting
3. Grid design and system hardening
4. Asset management and inspections
5. Vegetation management and inspections
6. Grid operations and protocols
7. Data governance
8. Resource allocation methodology
9. Emergency planning and preparedness
10. Stakeholder cooperation and community engagement

CAL FIRE

CAL FIRE provides fire protection and stewardship of over 31 million acres of California's wildlands. The Office of the State Fire Marshal supports CAL FIRE's mission to protect life and property through fire prevention engineering programs, law and code enforcement, and education.

Fire suppression in the Proposed Project area is a shared responsibility through the Cooperative Fire Protection Agreements with CAL FIRE and Tehama County Fire Department . Closest to the Proposed Project is CAL FIRE Tehama Glenn Units including Manton, Lassen Lodge, and Paynes Creek. In addition, Tehama County Fire Department Stations 20 and 21 in Mineral and Paynes Creek, respectively, and the Manton Volunteer Fire Department are in the vicinity (Fire Department.net, 2020).

Fire Hazard Severity Zones

CAL FIRE designates fire hazard severity zones pursuant to Government Code sections 51175 to 51189. CAL FIRE considers many factors such as fire history, existing and potential fuel (natural vegetation), flame length, blowing embers, terrain, and typical weather for the area. There are three hazard zones in State Responsibility Areas: moderate, high, and very high. CAL FIRE designates FHSZs within three types of areas depending on what level of government is financially responsible for fire protection:

- LRA: Local Responsibility Area: cities and counties are financially responsible for wildfire protection
- SRA: State Responsibility Area
- FRA: Federal Responsibility Area

State Responsibility Area Fire Safe Regulations

SRA Fire Safe Regulations outline basic wildland fire protection standards and can decrease the risk of wildfire events in the wildland interface. SRA Fire Safe Regulations do not supersede local regulations that equal or exceed minimum state regulations. The state statute for wildfire protection is PRC section 4290. Requirements in the PRC include information on:

- Road standards for fire equipment access
- Standards for signs identifying streets, roads, and buildings
- Minimum private water supply reserves for emergency fire use
- Fuel breaks and greenbelts

The Tehama County Fire Department is responsible for suppression of wildland fires within the LRA not protected by other jurisdictions. CAL FIRE is financially responsible for wildland fire suppression and prevention in the SRA.

4.19.2.3 Local

Tehama County Office of Emergency Services

Tehama County has prepared an Emergency Operations Plan (EOP). The most current version is 2017 (Tehama County, 2017). The EOP has been developed in an effort to effectively use appropriate resources to prepare for, respond to, and recover from disasters. The EOP conforms to state and federal regulations related to emergency services. According to the County Sheriff's Office, evacuation routes are the major highways (Houghtby, pers. comm., 2020).

Tehama County General Plan

The 2009 Tehama County General Plan Safety Element contains policies and implementation measures related to fire protection. The following aspects are relevant to the Proposed Project:

- *GOAL SAF–3:* To protect the people and property within Tehama County against fire related loss and damage.
  - *Policy SAF–3.1:* The County shall require accepted fire–resistive construction practices, including but not limited to site design and layout; use of appropriate landscaping and building materials; and the installation of automatic fire sprinklers on new and redevelopment projects to the extent permitted by law.
    - *Implementation Measure SAF–3.1b*: The County shall require that all new developments that are located in the SRA or in a LRA "Very High Fire" Severity Zone conform to the California Building Code's "Material and Construction Methods for Exterior Wildfire Exposure" (Chapter 7A).
  - *Policy SAF–3.2*: The County shall require new developments in State Responsibility Areas and other fire prone areas to mitigate all hazards to acceptable levels.
    - *Implementation Measure SAF–3.2a*: Review development proposals to determine if new development projects are located in State Responsibility Areas or fire prone areas. If development is permitted in these areas, ensure that

mitigation measures are required that ensure the health and safety of Tehama County citizens.

- *Implementation Measure SAF–3.5k*: Enforce the countywide weed abatement ordinance to minimize the spread of any fire to other properties and buildings; increase the success of suppression efforts; and compliment the beneficial effect of other fire hazard reduction endeavors.

4.19.3 Methodology

4.19.3.1 Analytical Approach

A wildfire hazard is the potential for wildfire to occur in an area; wildfire risk is the likelihood for wildfire to harm people and/or damage property. The Proposed Project area is located in an SRA, for which CAL FIRE is responsible for fire suppression. CAL FIRE has identified the Proposed Project area as being in a Very High FHSZ. The Proposed Project is also a CPUC Tier 2 "Elevated" HFTD. The Proposed Project is evaluated on its potential to impact existing fire and emergency services, exacerbate wildfire risks, and/or expose people or structures to significant risks. The area of assessment for addressing wildfire impacts is CAL FIRE's service area within Tehama County.

Pursuant to the California Supreme Court's 2015 decision in *California Building Industry Association v. Bay Area Air Quality Management District*, while CEQA requires agencies to analyze a project's impacts on the environment, it generally does not require an analysis of the impacts of existing environmental conditions on a project ((2015) 62 Cal.4th 369, 377). However, under CEQA an agency must evaluate how a project might exacerbate existing environmental hazards or conditions (*Id. a*t p. 392).

4.19.3.2 Criteria for Determining Significance

Based on Appendix G of the 2020 CEQA Guidelines, if the project is located in or near SRAs or lands classified as very high fire hazard severity zones, the project would have an impact if it would:

- Substantially impair an adopted emergency response plan or emergency evacuation plan
- Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire
- Require the installation of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment
- Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post–fire slope instability, or drainage changes

4.19.4 Applicant's Proposed Measures

The Proposed Project does not include any environmental measures that specifically address wildfire–related impacts; however the proposed Noxious Weed Management and Revegetation Plan would lessen wildfire risk, as discussed below.

4.19.5 Environmental Impacts and Mitigation

4.19.5.1 Impacts Related to Emergency Response Plans

IMPACT 4.19–1: Substantially impair an adopted emergency response plan or emergency evacuation plan?

Construction

The four multi–purpose areas that would be used for construction staging and ongoing Proposed Project maintenance are located in designated and marked areas adjacent to Road 120A and Road 110A within SPI boundaries, and adjacent to South Powerhouse Road within the Tehama County right–of–way (ROW). Several other temporary construction areas within SPI boundaries would also be utilized.

In the Proposed Project area, SR 36 serves as an evacuation route. Local roadways, including South Powerhouse Road and Hazen Road, would also be used for evacuation. Although Roads 120A and 110A are located on SPI lands, construction vehicles entering and existing construction sites could affect access to SR 36. In addition, existing dirt roads that would be used to access the Proposed Project area are also used by emergency fire vehicles. Construction traffic could temporarily delay or impair area evacuation and emergency routes due to large vehicles entering and existing the multi–purpose areas and due to potential lane closures. This would be a significant impact.

Operation and Maintenance

None of the Proposed Project components would be located along area evacuation and emergency routes. In addition, operation and maintenance would involve up to four weekly vehicle trips for operations. Maintenance activities would require up to 24 vehicle trips annually, which are expected to occur over during a 2– to 4–week period. Due to the low operation and maintenance needs of the Proposed Project, the Proposed Project is not expected to interfere substantially with area evacuation and emergency routes. In addition, the Proposed Project would not involve any material changes to public streets, roads, or evacuation infrastructure.

Although operation and maintenance of Proposed Project facilities would not substantially impair an adopted emergency response plan or emergency evacuation plan, construction activities could delay or impair emergency vehicle access and evacuation routes. This would be considered a significant impact. Mitigation Measure FIRE–1 is required to reduce the impact to less than significant. Implementation of Mitigation Measure FIRE–1)[49] would reduce impacts

[49] Although Mitigation Measure FIRE–1 falls outside the purview of the State Water Board, Rugraw has agreed to implement this measure.

related to impairing an adopted emergency response plan or emergency evacuation plan to less than significant.

Construction, Operation, and Maintenance Impacts

- **Level of Significance:** Less Than Significant with Mitigation Incorporated
- **Mitigation Measure FIRE–1: Wildfire Mitigation Plan**

  1a. To minimize the risk of wildfire, prior to Proposed Project construction, Rugraw shall submit a Wildfire Mitigation Plan (WMP) in compliance with SB 901 legislation and with direction from the CPUC (Rulemaking 18–10–007 updated December16, 2019, as clarified December 23, 2019).

  1b. The WMP shall be reviewed and approved by the CPUC and CAL FIRE.

  1c. The WMP shall include the following, unless directed otherwise by the CPUC and CAL FIRE:

  - Persons responsible for executing the plan;
  - Metrics and underlying data;
  - Baseline ignition probability and wildfire risk exposure;
  - Inputs to the plan, including current and directional vision for wildfire risk exposure; and
  - Wildfire mitigation activity for each year of the 3–year WMP term, including expected outcomes of the 3–year plan.

  The objectives of the WMP shall, at a minimum, be consistent with the requirements of Public Utilities Code section 8386, subdivision (a). This includes a description of utility WMP objectives, categorized by each of the following timeframes:

  - Before the upcoming wildfire season, as defined by CAL FIRE;
  - Before the next annual update;
  - Within the next 3 years; and
  - Within the next 10 years.

  The WMP shall also specifically address the use of South Fork Battle Creek as a source of water for suppression activities.

Significance after Mitigation

Implementation of this measure would reduce potential conflicts with emergency response plans to a less–than–significant level.

4.19.5.2 Impacts Related to Pollutants and Wildfire Spread

IMPACT 4.19–2: Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?

Construction, Operation, and Maintenance

Construction, operation, and maintenance activities would use equipment that could ignite nearby vegetation or construction materials and cause a wildfire, creating a hazard for residents, recreationists, workers, and structures in the vicinity of the Proposed Project. In addition, development of the transmission line could increase fire risks in the area. Transmission lines have been the source of several recent and historically large fires in California. Electric generation and related utility companies have been under increased scrutiny with regard to fire safety practices, especially related to vegetation clearing around infrastructure This would be a significant impact.

Under Mitigation Measure FIRE–1, Rugraw is required to implement a WMP that must be approved by the CPUC and CAL FIRE. The WMP is required to address all stages of a project including construction, operation, and maintenance. The WMP must also be consistent with applicable state laws and regulations for fire prevention and protection, and include identification of fire safety measures, fire prevention and control requirements, and other procedures. Implementation of Mitigation Measure FIRE–1 would reduce impacts related to exacerbated wildfire risks and exposing project occupants to wildfire–produced pollutants to less than significant.

Construction, Operation, and Maintenance Impacts

- **Level of Significance:** Less Than Significant with Mitigation Incorporated
- **Mitigation Measure:** Implement Mitigation Measure FIRE–1

Significance after Mitigation

Implementation of this measure would reduce impacts to pollutant and wildfire spread to a less–than–significant level.

4.19.5.3 Impacts Related to Infrastructure

IMPACT 4.19–3: Require the installation of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?

Construction

CAL FIRE has identified the Proposed Project area as being in a Very High FHSZ, which is defined as an area at extreme risk for wildfires. Similarly, the CPUC has designated the Proposed Project area as a Tier 2 “Elevated” HFTD. Construction activities could provide a source of ignition for a fire (e.g., diesel and fuel powered vehicles, welding or cutting, etc.) and

thus have the potential to exacerbate the existing risk of wildland fire. This would be a significant impact.

Under Mitigation Measure FIRE–1, Rugraw is required to implement a WMP that must be approved by the CPUC and CAL FIRE. The WMP is required to address all stages of a project including construction, operation, and maintenance. The WMP must also be consistent with applicable state laws and regulations for fire prevention and protection, and include identification of fire safety measures, fire prevention and control requirements, and other procedures.

Implementation of Mitigation Measure FIRE–1 would reduce construction impacts related to infrastructure that may exacerbate fire risk to less than significant.

Operation and Maintenance

Operation and maintenance would also provide sources of ignition for a fire (e.g., diesel and fuel powered vehicles, welding or cutting, etc.) and thus have the potential to exacerbate the existing risk of wildland fire. In addition, development of the transmission line could increase fire risks in the area. Transmission lines have been the source of several recent and historically large fires in California. Electric generation and related utility companies have been under increased scrutiny with regard to fire safety practices, especially related to vegetation clearing around infrastructure.

Under the Proposed Project, the transmission line, service station line, and pipeline/penstock ROWs would serve as fire breaks. The ROWs for these areas would require regular vegetation management activities, such as those described in the Proposed Project's Noxious Weed and Revegetation Management Plan (see Section 2.3.5.2), to ensure the safe operation and reliability of the Proposed Project.

CAL FIRE is a member of the Greater Battle Creek Working Group, which also includes Rugraw. The working group has discussed the Proposed Project. CAL FIRE has indicated it supports proposed vegetation management and the fuel break that would be created by the transmission line ROW, specifically along Hazen Road. In addition, CAL FIRE and SPI have filed Statements of Diversion and Use of waters of the South Fork Battle Creek for fire prevention and suppression (Rugraw, 2014).

Rugraw has proposed to implement a Noxious Weed Management and Revegetation Plan (Tetra Tech, 2014), which includes maintaining minimum clearance distances from conductors to prevent fires and outages that could be caused by trees or vegetation damaging the lines. Vegetation management inspections would be conducted on an annual basis to monitor vegetation encroachment the ROWs. Clearing would be done every other year, or more often as may be required, which would help reduce fire fuels within the Proposed Project area.

Although implementation of the Noxious Weed Management and Revegetation Plan would lessen fire risk, it does not include provisions for fire prevention and protection. Therefore, infrastructure operation and maintenance activities could exacerbate fire risk. This would be a significant impact.

Under Mitigation Measure FIRE–1, Rugraw is required to implement a WMP that must be consistent with applicable state laws and regulations for fire prevention and protection. Public Resources Code section 4293, administered by CAL FIRE, requires a 4–foot minimum clearance be maintained for power lines between 2,400 and 72,000 volts, and a 10–foot

clearance for conductors 115,000 volts and above. The proposed transmission line is 60 kV, or 60,000 volts.

The risk of wildfire would continue to be very high, but implementation of a CPUC–approved WMP would improve public safety by ensuring that Proposed Project construction, operation, and maintenance activities are conducted in a manner that would prevent the ignition and spread of wildland fires. Implementation of Mitigation Measure FIRE–1 would reduce operation and maintenance impacts related to infrastructure that may exacerbate fire risk to less than significant.

Construction, Operation, and Maintenance Impacts

- **Level of Significance:** Less Than Significant with Mitigation Incorporated
- **Mitigation Measure:** Implement Mitigation Measure FIRE–1

Significance after Mitigation

Implementation of this measure would reduce infrastructure impacts to a less–than–significant level.

4.19.5.4 Impacts Related to Flooding and Landslides

IMPACT 4.19–4: Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post–fire slope instability, or drainage changes?

Construction, Operation, and Maintenance

There are no construction, operation, and maintenance activities that could affect downslope or downstream flooding. The Proposed Project area is not located in a high risk landslide area, as defined by the California Geological Survey (CGS, 2011). The amount of impervious surface created by the Proposed Project would not be considered substantial enough to affect existing drainage patterns. Implementation of the Proposed Project would not expose people and property to significant risks, including downslope or downstream flooding or landslides, as a result of runoff or drainage changes.

However, areas outside the Proposed Project boundary, including the Ponderosa Fire area of influence, have experienced soil instability due to rapid storm runoff in burned areas in the lower reaches of South Fork Battle Creek (Rugraw, 2014). Due to the development of transmission lines, the Proposed Project could increase fire risks in the area, which could result in post–slope fire instability. This would be a significant impact.

As discussed in Impacts 4.19–1 through 4.19.3, under Mitigation Measure FIRE–1Rugraw has agreed to implement an approved WMP. One component of the WMP is ignition probability and wildfire risk exposure, which will identify methods used to treat post–fire areas. Implementation of this measure would minimize the Proposed Project's effects on unstable slope conditions post–fire by ensuring slopes would be adequately stabilized. Implementation of Mitigation Measure FIRE–1 would reduce the impacts related to post fire conditions to less than significant.

Construction, Operation, and Maintenance Impacts

- **Level of Significance:** Less Than Significant with Mitigation Incorporated
- **Mitigation Measure:** Implement Mitigation Measure FIRE–1.

Significance after Mitigation

Implementation of this measure would reduce flooding and landslide impacts to a less–than–significant level.

4.19.6 References

CAL FIRE. 2007. Fire Hazard Severity Zones Map in State Responsibility Area, Tehama County. November 6, 2007. Found at: osfm.fire.ca.gov

California Department of Forestry and Fire Protection (CAL FIRE). 2019. 2019 Strategic Plan California Department of Forestry and Fire Protection. Found at: www.fire.ca.gov

California Public Utilities Commission (CPUC). 2019. R.18–10–007, Attachment 1, WMP Guidelines. December 16, 2019.

CPUC website. 2020. Utility Wildfire Mitigation Plans. Found at: www.cpuc.ca.gov

Fire Department.Net. 2020. Tehama County Fire Departments. Found at: www.firedepartment.net

Houghtby, Sgt. 2020. Sargent, Tehama County Sheriff's Office (TCSO). Personal communication with Sargent Houghtby. April 20, 2020.

Tehama County. 2009. Tehama County Emergency Operations Plan. June 27, 2017. Found at: tehamaso.org

Tehama County. 2009. Tehama County General Plan. March 2009. Found at: www.co.tehama.ca.us

Chapter 5 Alternatives Summary

5.1 Introduction

As discussed in *Chapter 3, Alternatives Descriptions*, California Environmental Quality Act (CEQA) Guidelines section 15126.6, subdivision (a) states that:

> *An EIR shall describe a range of reasonable alternatives to the project, or the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project, and evaluate the comparative merits of the alternatives. An EIR need not consider every conceivable alternative to a project. Rather it must consider a reasonable range of potentially feasible alternatives that will foster informed decision making and public participation. An EIR is not required to consider alternatives which are infeasible. The lead agency is responsible for selecting a range of project alternatives for examination and must publicly disclose its reasoning for selecting those alternatives. There is no ironclad rule governing the nature or scope of the alternatives to be discussed other than the rule of reason.*

This chapter is intended to inform the public and decision makers of a reasonable range of feasible alternatives to the Proposed Project that would avoid or substantially lessen any significant effect of the Proposed Project. This chapter includes the following discussions:

- Overview of Proposed Project objectives;
- Summary of the alternatives (detailed descriptions are in *Chapter 3, Alternatives Descriptions*);
- Assumptions and methodology of the alternatives analysis;
- Analysis of how each alternative would reduce the impacts of the Proposed Project;
- Discussion of the relationship of each alternative to the Proposed Project objectives; and
- Identification of the environmentally superior alternative.

Table 5–1 provides the summary of Proposed Project impacts compared to the impacts of the alternatives. The impacts of each alternative are classified as greater, reduced or eliminated, or similar to the level of impacts associated with the Proposed Project.

As organized in Chapter 4 of the EIR, several environmental resource sections have identified sub–issues of the primary impact. This occurs in the following sections: 4.6, Biological Resources – Aquatics and Fisheries; Section 4.7 Biological Resources – Terrestrial; and Section 4.13, Hydrology and Water Quality. For purposes of this summary, Table 5–1 identifies the highest overall level of impact significance before mitigation for only the primary impact. For example, Impact 4.6–1 analyzes: overall habitat; hydrology; water quality; water temperature; specific habitat analysis for special–status fish, amphibians, and reptiles, and resident fish; and effects of sediment transport. Of those sub–issues five were determined to have significant impacts requiring mitigation, whereas the remaining were determined to be less than significant. Further, all environmental resource sections separately identify construction, operation, and

maintenance impacts of the Proposed Project. For the expanded analysis of the sub–issues refer to the appropriate section of the EIR.

Legend for Table 5–1:

- IG = Impacts are greater compared to Proposed Project
- IR = Impacts are reduced or eliminated compared to Proposed Project
- IS = Impacts are similar to the Proposed Project
- LTS = Less than Significant
- LSM = Less than Significant with Mitigation Incorporated
- NI = No Impact
- S = Potentially Significant Impact
- SU = Significant and Unavoidable

Table 5–1. Comparison of Project Impacts and Project Alternatives Impacts

Environmental Resource	Proposed Project	No Project Alternative	Alternative 1	Alternative 2	Alternative 3
4.3 Aesthetics					
IMPACT 4.3–1: Would the project have a substantial adverse effect on a scenic vista?	NI	IR	IS	IS	IS
IMPACT 4.3–2: Would the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	LTS	IR	IS	IS	IS
IMPACT 4.3–3: Would the Proposed Project substantially degrade the existing visual character or quality of public views of the site and its surroundings?	SU	IR	IS	IS	IS
IMPACT 4.3–4: Would the project create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	LTS	IR	IS	IS	IS
4.4 Agricultural and Forest Resources					
IMPACT 4.4–1: Would the project 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?	NI	IR	IS	IS	IS
IMPACT 4.4–2: Would the project conflict with existing zoning for agricultural use, or a Williamson Act contract?	LTS	IR	IS	IS	IS
IMPACT 4.4–3: Would the project 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))?	LTS	IR	IS	IS	IS
IMPACT 4.4–4: Would the project result in the loss of forest land or conversion of forest land to non–forest use?	LTS	IR	IS	IS	IS

TABLE 5–1 LEGEND: IG = Impacts are greater compared to Proposed Project; **IR** = Impacts are reduced or eliminated compared to Proposed Project; **IS** = Impacts are similar to the Proposed Project; **LTS** = Less than Significant; **LSM** = Less than Significant with Mitigation Incorporated; **NI** = No Impact; **S** = Potentially Significant Impact; **SU** = Significant and Unavoidable

Environmental Resource	Proposed Project	No Project Alternative	Alternative 1	Alternative 2	Alternative 3
IMPACT 4.4–5: Would the project 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?	NI	IR	IS	IS	IS
4.5 Air Quality					
IMPACT 4.5–1: Would the project conflict with or obstruct implementation of the Northern Sacramento Valley Planning Area 2018 Triennial Air Quality Attainment Plan?	LTS	IR	IS	IS	IS
IMPACT 4.5–2: Would the project result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non–attainment under an applicable federal or state ambient air quality standard?	LSM	IR	IS	IS	IS
IMPACT 4.5–3: Would the project expose sensitive receptors to substantial pollutant concentrations?	LSM	IR	IS	IS	IS
IMPACT 4.5–4: Would the project result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?	LTS	IR	IS	IS	IS
4.6 Biological Resources – Aquatics and Fisheries					
IMPACT 4.6–1: Would the Proposed Project 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 or USFWS?	SU	IR	IR	IR	IS
IMPACT 4.6–2: Would the Proposed Project interfere substantially with the movement of any native resident or migratory wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	SU	IR	IR	IR	IR
IMPACT 4.6–3: Would the project conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	LTS	IR	IR	IR	IR

TABLE 5–1 LEGEND: IG = Impacts are greater compared to Proposed Project; **IR** = Impacts are reduced or eliminated compared to Proposed Project; **IS** = Impacts are similar to the Proposed Project; **LTS** = Less than Significant; **LSM** = Less than Significant with Mitigation Incorporated; **NI** = No Impact; **S** = Potentially Significant Impact; **SU** = Significant and Unavoidable

Environmental Resource	Proposed Project	No Project Alternative	Alternative 1	Alternative 2	Alternative 3
IMPACT 4.6–4: Would the Proposed Project conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state Habitat Conservation Plans?	LTS	IR	IS	IR	IS
4.7 Biological Resources – Terrestrial					
IMPACT 4.7–1: Would the Proposed Project 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 or USFWS?	SU	IR	IS	IS	IS
IMPACT 4.7–2: Would the Proposed Project 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 U.S. Fish and Wildlife Service?	SU	IR	IS	IS	IS
IMPACT 4.7–3: Would the Proposed Project interfere substantially with the movement of any native resident or migratory wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	LTS	IR	IS	IS	IS
IMPACT 4.7–4 Would the Proposed Project conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	SU	IR	IS	IS	IS
IMPACT 4.7–5: Would the Proposed Project conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state Habitat Conservation Plans?	NI	IR	IS	IS	IS
4.8 Cultural Resources					
IMPACT 4.8–1: Would the action cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5?	LTS	IR	IS	IS	IS
IMPACT 4.8–2: Would the action cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5?	LTS	IR	IS	IS	IS

TABLE 5–1 LEGEND: IG = Impacts are greater compared to Proposed Project; **IR** = Impacts are reduced or eliminated compared to Proposed Project; **IS** = Impacts are similar to the Proposed Project; **LTS** = Less than Significant; **LSM** = Less than Significant with Mitigation Incorporated; **NI** = No Impact; **S** = Potentially Significant Impact; **SU** = Significant and Unavoidable

Environmental Resource	Proposed Project	No Project Alternative	Alternative 1	Alternative 2	Alternative 3
IMPACT 4.8–3: Would the action disturb any human remains, including those interred outside of dedicated cemeteries?	LTS	IR	IS	IS	IS
4.9 Energy					
IMPACT 4.9–1: Would the project result in potentially significant environmental impact due to wasteful, inefficient, unnecessary consumption of energy resources during project construction or operation?	LTS	IR	IS	IS	IS
IMPACT 4.9–2: Would the project conflict with or obstruct a State or local plan for renewable energy or energy efficiency?	LSM	IR	IS	IS	IS
4.10 Geology and Soils					
IMPACT 4.10–1: 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?	NI	IR	IS	IS	IS
ii. Strong seismic ground shaking?	LTS	IR	IS	IS	IS
iii. Seismic–related ground failure, including liquefaction?	LTS	IR	IS	IS	IS
iv. Landslides?	NI	IR	IS	IS	IS
IMPACT 4.10–2: Result in substantial soil erosion or the loss of topsoil?	LTS	IR	IS	IS	IS
IMPACT 4.10–3: 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?	LTS	IR	IS	IS	IS
IMPACT 4.10–4: 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?	NI	IR	IS	IS	IS

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Environmental Resource	Proposed Project	No Project Alternative	Alternative 1	Alternative 2	Alternative 3
IMPACT 4.10–5: 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?	NI	IR	IS	IS	IS
IMPACT 4.10–6: Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	LTS	IR	IS	IS	IS
4.11 Greenhouse Gas Emissions					
IMPACT 4.11–1: Would the project generate greenhouse gas emissions, either directly or indirectly, that would conflict with the implementation of AB32?	LTS	IR	IS	IS	IS
IMPACT 4.11–2: Would the project conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	LSM	IR	IS	IS	IS
4.12 Hazards and Hazardous Materials					
IMPACT 4.12–1: Would the project create substantial exposure to hazardous materials, where substantial is defined as quantities of hazardous, or acutely hazardous, materials that would be harmful to the public or the environment?	LTS	IR	IS	IS	IS
IMPACT 4.12–2: Would the project emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one–quarter mile of an existing or proposed school?	NI	IR	IS	IS	IS
IMPACT 4.12–3: Would the project 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 it create a significant hazard to the public or the environment?	NI	IR	IS	IS	IS
IMPACT 4.12–4: 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, would the project result in a safety hazard or excessive noise for people residing or working in the project area?	LTS	IR	IS	IS	IS

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Environmental Resource	Proposed Project	No Project Alternative	Alternative 1	Alternative 2	Alternative 3
IMPACT 4.12–5: Would the project impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	LSM	IR	IS	IS	IS
IMPACT 4.12–6: Would the project expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires?	LSM	IR	IS	IS	IS
4.13 Hydrology and Water Quality					
IMPACT 4.13–1: Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality?	SU	IR	IS	IS	IS
IMPACT 4.13–2: Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?	LTS	IR	IS	IS	IS
IMPACT 4.13–3: Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:	–	–	–	–	–
i. Result in substantial on– or offsite erosion or siltation?	SU	IR	IS	IS	IS
ii. Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on or offsite?	LTS	IR	IS	IS	IS
iii. 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?	SU	IR	IS	IS	IS
iv. Impede or redirect flood flows?	LTS	IR	IS	IS	IS
IMPACT 4.13–4: In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?	SU	IR	IS	IS	IS
IMPACT 4.13–5: Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?	SU	IR	IS	IS	IS

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Environmental Resource	Proposed Project	No Project Alternative	Alternative 1	Alternative 2	Alternative 3
4.14 Land Use and Planning					
IMPACT 4.14–1: Would the project physically divide an established community?	LTS	IR	IS	IS	IS
IMPACT 4.14–2: Would the project conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect in a manner that would prevent the avoidance or mitigation result sought to be achieved by the plan, policy, or regulation?	LTS	IR	IS	IS	IS
4.15 Noise					
IMPACT 4.15–1: Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or in other applicable local, state, or federal standards?	LSM	IR	IS	IS	IS
IMPACT 4.15–2: Generation of excessive groundborne vibration or groundborne noise levels?	LTS	IR	IS	IS	IS
IMPACT 4.15–3: For a project located within the vicinity of a private airstrip or 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, would the project expose people residing or working in the project area to excessive noise levels?	NI	IR	IS	IS	IS
4.16 Recreation					
IMPACT 4.16–1: 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?	LTS	IR	IS	IS	IS
IMPACT 4.16–2: Include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment?	LTS	IR	IS	IS	IS

TABLE 5–1 LEGEND: IG = Impacts are greater compared to Proposed Project; **IR** = Impacts are reduced or eliminated compared to Proposed Project; **IS** = Impacts are similar to the Proposed Project; **LTS** = Less than Significant; **LSM** = Less than Significant with Mitigation Incorporated; **NI** = No Impact; **S** = Potentially Significant Impact; **SU** = Significant and Unavoidable

Environmental Resource	Proposed Project	No Project Alternative	Alternative 1	Alternative 2	Alternative 3
4.17 Transportation and Traffic					
IMPACT 4.17–1: Conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities?	LTS	IR	IS	IS	IS
IMPACT 4.17–2: Conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b)?	LTS	IR	IS	IS	IS
IMPACT 4.17–3: Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	LTS	IR	IS	IS	IS
IMPACT 4.17–4: Result in inadequate emergency access?	LTS	IR	IS	IS	IS
4.18 Tribal Cultural Resources					
IMPACT 4.18–1: Would the Proposed 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)	LTS	IR	IS	IS	IS
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.	LTS	IR	IS	IS	IS

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Environmental Resource	Proposed Project	No Project Alternative	Alternative 1	Alternative 2	Alternative 3
4.19 Wildfire					
IMPACT 4.19–1: Substantially impair an adopted emergency response plan or emergency evacuation plan?	LSM	IR	IS	IS	IS
IMPACT 4.19–2: Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?	LSM	IR	IS	IS	IS
IMPACT 4.19–3: Require the installation of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?	LSM	IR	IS	IS	IS
IMPACT 4.19–4: Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post–fire slope instability, or drainage changes?	LSM	IR	IS	IS	IS

TABLE 5–1 LEGEND: IG = Impacts are greater compared to Proposed Project; **IR** = Impacts are reduced or eliminated compared to Proposed Project; **IS** = Impacts are similar to the Proposed Project; **LTS** = Less than Significant; **LSM** = Less than Significant with Mitigation Incorporated; **NI** = No Impact; **S** = Potentially Significant Impact; **SU** = Significant and Unavoidable

5.2 Proposed Project Objectives

As required by section 15124, subdivision (b) of the CEQA Guidelines, this EIR identifies project objectives that are used in evaluating the alternatives to determine whether, and to what extent, the alternatives achieve the intent of a proposed project. In evaluating alternatives, a lead agency must consider both an alternative's consistency with project objectives and its potentially significant impacts.

The underlying purpose of the Proposed Project is to provide hydroelectric power. Three specific objectives related to this purpose, to be accomplished through the Proposed Project, are:

1. **Generate electricity for the term of the license to produce electric power.** The Proposed Project would generate electricity to help meet California's power requirements. It would produce approximately 5 megawatts (MW) of power per hour of operation and is expected to produce an average of 24,936 megawatt–hours (MWh) per year.
2. **Provide renewable energy to help California meet its Renewables Portfolio Standard (RPS).** In 2002, the state of California established its RPS program, which requires that a specific percentage of electricity retail sales must come from renewable energy resources, which include small hydroelectric facilities. The Proposed Project would contribute to California's efforts to meet its RPS requirements by producing approximately 5 MW per hour of operation and an average of 24,936 MWh of renewable energy per year.
3. **Identify and implement measures to avoid or mitigate damage to the environment, including fish and wildlife, and protect beneficial uses of South Fork Battle Creek.** Rugraw will develop and implement several plans and programs to ensure compliance with water quality standards and other appropriate requirements of state law. These plans and programs will address concerns related to fish and wildlife, as well as temperature, turbidity, pH, and other aspects of water quality. In addition, the Proposed Project would not affect the planned Battle Creek Salmon and Steelhead Restoration Project.

5.3 Alternatives Analysis Assumptions and Methodology

This analysis compares the impacts of the alternatives to those of the Proposed Project. The No Project Alternative is what would reasonably be expected to occur in the foreseeable future, based on current plans and consistent with available infrastructure and community services, if the Proposed Project was not approved and implemented. Therefore, the No Project Alternative assumes no changes would occur to the area of the Proposed Project, including any new development.

The overall extent of development for Alternatives 1, 2, and 3 would be the same as the Proposed Project, since most of the Proposed Project components would still be implemented. However, Alternatives 1, 2, and 3 were developed to specifically address the potentially significant aquatic resources impacts of the Proposed Project, as detailed in *Section 4.6, Biological Resources – Aquatics and Fisheries*. Alternatives 1, 2, and 3 assume that all

applicable regulations and all mitigation measures identified for the Proposed Project would be implemented for each alternative.

The majority of environmental impacts analyzed in *Chapter 4, Environmental Analysis*, would not change significance under Alternatives 1, 2, and 3 when compared to the Proposed Project. These environmental resources include: aesthetics, agricultural and forest resources, air quality, biological resources – terrestrial, cultural resources, energy, geology and soils, greenhouse gas emissions, hazards and hazardous materials, land use and planning, noise, recreation, transportation, tribal cultural resources, and wildfire. As described throughout Chapter 4, Applicant–proposed environmental measures, management and monitoring plans, and if necessary, mitigation measures, would be required to reduce construction, operation, and maintenance impacts to less than significant.

Therefore, the alternatives analysis in this EIR focuses on those environmental issues that would result in potentially significant impacts under the Proposed Project, as analyzed in *Section 4.6, Biological Resources – Aquatics and Fisheries.*

5.4 Alternatives to the Proposed Project

As discussed in detail in *Chapter 3, Alternatives Descriptions*, in addition to the No Project Alternative, the alternatives evaluated include, in addition to all measures and plans included in the Proposed Project, modified measures/conditions proposed by state and/or federal agencies during the Federal Energy Regulatory Commission (FERC) licensing proceeding. In addition to the No Project Alternative, the following alternatives descriptions and analyses are summarized from Chapter 3 and *Section 4.6, Biological Resources – Aquatics and Fisheries,* respectively.

5.4.1 Alternatives Analysis

5.4.1.1 No Project Alternative

Under CEQA, the No Project Alternative is what would reasonably be expected to occur in the foreseeable future, based on current plans and consistent with available infrastructure and community services, if the Proposed Project was not approved and implemented.

No Project Alternative Analysis

The No Project Alternative is what would reasonably be expected to occur in the foreseeable future, based on current plans and consistent with available infrastructure and community services, if the Proposed Project was not approved and implemented. The Proposed Project area is mostly located on lands zoned Timber Production Zoning (TPZ), with small areas zoned Natural Resource (NR), Agricultural/Upland District (AG–1), and Public Agency (PA) (Tehama County 2009). Under the No Project Alternative, existing land uses would continue under the current ownership and management by Sierra Pacific Industries, Tehama County, and other private landowners, as allowed by the 2009 Tehama County General Plan and 1984 Tehama County Charter and Code, *Title 17 – Zoning*. There are no current proposals that would change any of these land use designations and zonings.

Since the No Project Alternative would allow continuation of the existing uses, it would not result in any of the impacts identified for the Proposed Project, as described in *Chapter 4, Environmental Analysis*.

However, the No Project Alternative would not meet most of the Proposed Project objectives since the hydroelectric facility would not be constructed. Without the Proposed Project, the hourly 5 MW of power and annual 24,936 MWh of renewable energy would not be produced (Objective 1). As a result, there would be no contribution to California's RPS program, which requires that a specific percentage of electricity retail sales must come from renewable energy resources (Objective 2). In addition, the No Project Alternative would not provide any improvements that could benefit South Fork Battle Creek, but the alternative would avoid potential conflicts with the Battle Creek Salmon and Steelhead Restoration Project (Objective 3).

5.4.1.2 Alternative 1 – Minimum Instream Flow

Alternative 1 includes a minimum instream flow (MIF) of 25 to 35 cfs year–round compared to the Proposed Project's MIF of 13 cfs year–round. In its Final EIS, FERC (2018b) analyzed the full range of minimum flows (e.g., 13 to 35 cfs) using habitat data from Cramer and Ceder (2013) and the USFWS (2016) PHABSIM. Based on this analysis, FERC Staff recommended a MIF of 13 cfs. The recommendation was based on various considerations, but in particular, that natural (unimpaired) flow in the bypass reach is often much lower than 13 cfs and is likely the limiting factor for the current resident O. mykiss fishery. Similarly, CDFW (2016) concurred with Rugraw's 13 cfs MIF proposal for the current situation where anadromous fish are not present in the bypass reach due to downstream barriers. Alternative 1 incorporates: (1) the latest available Proposed Project hydrology data; (2) the latest available flow versus habitat data from Cramer et al. (2015); and (3) a re–analysis of the USFWS/NMFS PHABSIM data.

Under Alternative 1, the habitat versus flow relationships would be incorporated into a habitat time series analysis over the available hydrological period of record to determine the appropriate MIF condition. Alternative 1 explicitly addresses MIFs under two conditions: the condition where only resident species (e.g., O. mykiss) occur in the bypass reach and if, in the future, the condition where downstream barriers are removed and ESA listed salmonids successfully migrate into the bypass reach.

Alternative 1 Analysis

Alternative 1 would not improve resident fish or special–status amphibians and aquatic reptiles compared to the Proposed Project. Alternative 1 has the potential to benefit Chinook salmon habitat, steelhead spawning habitat, and habitat for fry that move downstream in the spring compared to the Proposed Project. However, this would occur only if Chinook salmon and steelhead adults access the bypass reach (successfully migrate pass the downstream diversion dams and navigate through natural barriers at Panther Grade (RM 18.9) and Powerhouse Falls near the powerhouse tailrace (RM 20.6). As stated in the Proposed Project Description, if anadromous fish are documented in the bypass reach, a Biological Assessment and informal consultation with NMFS and FERC would be necessary to determine if (1) the Proposed Project operations are adversely affecting anadromous salmonids, (2) what actions Rugraw will take to mitigate for adverse effects, if adverse effects have been determined, and (3) if opening the License is necessary; would adequately protect anadromous fish.

Alternative 1 includes a more comprehensive anadromous fish monitoring plan, which requires an additional instream flow study in the event fish are observed in the bypass reach that (1) covers the full range of hydrology, (2) addresses habitat related to fish density/carrying capacity, and (3) uses accurate fry/juvenile rearing and adult spawning habitat suitability criteria.

Compared to the Proposed Project, Alternative 1 is assumed to be more protective of anadromous fish.

Alternative 1 would meet the objectives of the Proposed Project since the hydroelectric facility would be constructed. Although Alternative 1 modifies the anadromous fish monitoring plan it would not affect the Proposed Project's ability to produce 5 MW of power during each hour of operation and an average of 24,936 MWh of renewable energy per year (Objective 1). As a result, there would be a contribution to California's RPS program, which requires that a specific percentage of electricity retail sales must come from renewable energy resources (Objective 2). Alternative 1 is assumed to be more protective of anadromous fish and better avoid potential conflicts with the Battle Creek Salmon and Steelhead Restoration Project than the Proposed Project, which meets Objective 3. In general, however, for the reasons identified in Section 4, Alternative 1 and the Proposed Project are expected to be similar in terms of protection of the environment and the resources discussed, and would be similar overall in terms of how they meet the Proposed Project objectives.

5.4.1.3 Alternative 2 – Ramping Rates

Alternative 2 evaluates ramping rates, including the following: (1) the appropriateness of a 1.0 inch per hour down ramping and/or up ramping rate for protecting biological resources, and (2) additional analysis to derive a down ramping rate (4 inches over 20 days from May 1 through July 31) that is protective of foothill yellow–legged frog breeding habitat (e.g., Yarnell et al., 2016), specifically related to potential foothill yellow–legged frog egg mass/tadpole dewatering.

The previously analyzed (FERC 2018) and agency recommended ramping rates (0.1 ft per hour from FERC and CDFW and 1.0 inch per hour from NMFS) (e.g., FERC, 2018b; CDFW, 2016; NMFS, 2016) did not distinguish between down ramping and up ramping rates, did not distinguish between Proposed Project–induced and natural ramping rates, and potentially did not adequately protect foothill yellow–legged frog egg masses/young tadpoles or fish redds.

Alternative 2 Analysis

Implementation of the Applicant's proposed measures and other management and monitoring plans would not be fully protective of foothill yellow–legged frog. Alternative 2 is similar to the Proposed Project, which includes a one inch/hour ramping rate and a separate ramping rate for foothill yellow–legged frog. Alternative 2, however, includes specifically both a one inch/hour down ramp and up ramp rate downstream of the diversion at an agency–approved (e.g., CDFW, USFWS, State Water Board) site. Alternative 2 also requires a down ramping rate of 4 inches/20 days from May 1 through July 31 that is measured at foothill yellow–legged frog breeding locations or at a narrower (more conservative) stage–discharge location that is agency approved. Compared to the Proposed Project, Alternative 2 would reduce significant impacts to foothill yellow–legged frog egg masses and early tadpoles from dewatering if they are present in the Proposed Project bypass reach. Therefore, Alternative 2 would result in decreased impacts when compared to the Proposed Project.

Alternative 2 would meet the objectives of the Proposed Project since the hydroelectric facility would be constructed. Although Alternative 2 modifies ramping rates, it would not affect the Proposed Project's ability to produce 5 MW of power during each hour of operation and an average of 24,936 MWh of renewable energy per year (Objective 1). As a result, there would be a contribution to California's RPS program, which requires that a specific percentage of

electricity retail sales must come from renewable energy resources (Objective 2). Alternative 2 would be more protective of foothill yellow–legged frog and avoid potential conflicts with the Battle Creek Salmon and Steelhead Restoration Project, which meets Objective 3. Alternative 3 – Temperature Project Shutdown Thresholds

Alternative 3 identifies alternative project temperature shutdown criteria to protect aquatic species and life stages during various seasons and uses empirical data to determine if the Proposed Project is cooling water temperature in the bypass reach (beneficial effect; allows Proposed Project operations to continue) or warming water temperature in the bypass reach (negative effect; requires Proposed Project shutdown). Alternative 3 explicitly evaluates Proposed Project–induced temperature effects in both the bypass reach and in the tailrace reach downstream of the powerhouse in the context of: (1) the existing conditions, where only resident salmonid species (e.g., rainbow trout) are present in the bypass reach, and (2) the potential future condition where ESA listed salmonids may access the bypass reach.

5.4.1.4 Alternative 3 – Temperature Proposed Project Shutdown Thresholds

Alternative 3 identifies project temperature shutdown criteria to protect aquatic species and life stages during various seasons and uses empirical data to determine if the Proposed Project is cooling water temperature in the bypass reach (beneficial effect; allows Proposed Project operations to continue) or warming water temperature in the bypass reach (negative effect; requires Proposed Project shutdown). Alternative 3 explicitly evaluates Proposed Project–induced temperature effects in both the bypass reach and in the tailrace reach downstream of the powerhouse in the context of: (1) the existing conditions, where only resident salmonid species (e.g., rainbow trout) are present in the bypass reach, and (2) the potential future condition where ESA–listed salmonids access the bypass reach.

The Proposed Project incorporates an average daily temperature Project shutdown threshold of 20°C, if there is Proposed Project–induced warming in the bypass reach based on real–time monitoring at the diversion and above Spring Number 4 (upstream of the powerhouse). The single criterion, 20°C, biologically is tailored to the summer season/life stages. CDFW also recommended an average daily temperature threshold of 20°C and State Water Board (2018) proposed 20°C 7–Day Average Daily Maximum (7DADM). Interior and NMFS 10(j) Recommendation 2 requested curtailing Proposed Project operation, as needed, to prevent the temperature seasonal/life stage specific exceedance for spring–run and winter–run Chinook salmon in the bypass reach downstream of Angel Falls.

Alternative 3 Analysis

Currently there are no data to suggest the Proposed Project would alter water temperature in the bypass reach or downstream of the Proposed Project when operating (Impact 4.6–1). The Water Temperature Monitoring Plan includes real–time temperature monitoring at the division dam, recording of flow being diverted into pipeline, and temperature upstream of Spring Number 4 (refer to *Section 4.6, Biological Resources – Aquatics and Fisheries* Figure 4.6–2) to determine in real–time if the Proposed Project is warming the bypass reach water temperature.

Alternative 3, with the NMFS 18°C 7DADM project shutdown criterion, would be more protective of juvenile steelhead and rainbow trout in the bypass reach during early summer of wetter years than either the Proposed Project 20°C daily average or the State Water Board 20°C 7DADM criterion (Figure 4.6–31). However, because of the natural high temperatures and extremely low

flows that occur each year in late summer/early fall when the Proposed Project would not be operating, it does not appear that the lower NMFS criterion would provide added value to the protection of rainbow trout. Generally, neither the Proposed Project 20°C average daily or the State Water Board 20°C 7DADM criterion are expected to be implemented very often because these temperatures only occur when flows are less than 18 cfs, when the Proposed Project is not operating because natural flows are too low (Figure 4.6–31).

When compared to the Proposed Project, until anadromous fish are documented in the bypass reach (Anadromous Fish Monitoring Plan), the 20°C 7DADM criterion is expected to be substantially similar to the Proposed Project's 20°C average daily water temperature criterion. With Rugraw's proposed measures regarding evaluation and potential reopening of the license if anadromous fish are documented in the bypass reach, Alternative 3 is also expected to be substantially similar to the Proposed Project.

Alternative 3 would meet the objectives of the Proposed Project since the hydroelectric facility would be constructed. Although Alternative 3 modifies temperature thresholds, it would not affect the Proposed Project's ability to produce 5 5 MW of power during each hour of operation and an average of 24,936 MWh of renewable energy per year (Objective 1). As a result, there would be a contribution to California's RPS program, which requires that a specific percentage of electricity retail sales must come from renewable energy resources (Objective 2). Alternative 3 is not expected to be substantially more protective of anadromous fish or substantially different in terms of avoiding potential conflicts with the Battle Creek Salmon and Steelhead Restoration Project than the Proposed Project and would similarly meet Objective 3.

Environmentally Superior Alternative

Section 15126.6, subdivision (e)(2) of the CEQA Guidelines requires that an "environmentally superior" alternative be identified. In addition, if the No Project Alternative is identified as the environmentally superior alternative, the EIR must also identify an Environmentally Superior Alternative among the other alternatives. The Environmentally Superior Alternative is the alternative expected to generate the fewest significant impacts. However, the Environmentally Superior Alternative may not be the alternative that best meets the objectives and underlying purpose of the Proposed Project. Therefore, CEQA does not require the lead agency to select the Environmentally Superior Alternative. (See CEQA Guidelines, §§ 15042–15043.)

As shown in Table 5–1, the No Project Alternative would not result in any of the significant impacts identified for the Proposed Project. However, the No Project Alternative would not meet the objectives of the Proposed Project. Regardless, the No Project Alterative is considered the environmentally superior alternative. However, in accordance with CEQA Guidelines section 15126.6, subdivision (e)(2), if the environmentally superior alternative is the "No Project" alternative, the Draft EIR shall also identify an environmentally superior alternative among the other alternatives. As discussed in this EIR, the Proposed Project will result in significant impacts without implementation of mitigation measures, including recommended measures. The only significant and unavoidable impact for which no potential mitigation measures have been identified is an aesthetic impact related to the transmission line (Impact 4.3–2). While this is true generally for the Proposed Project and all alternatives aside from the No Project Alternative, the one exception is a potentially significant impact to foothill yellow–legged frog egg masses that would be less than significant under Alternative 2.

Alternatives 1and 3 are considered potentially more protective of aquatic resources than the Proposed Project, however the additional protectiveness is speculative, and those alternatives would, in general, provide substantially similar protection of all resources analyzed. Alternative 2 would be most protective of aquatic species overall. Alternative 2 includes modified ramping rates to minimize potential impacts of foothill yellow–legged frog egg masses and early tadpoles from dewatering (if they become present in the Proposed Project bypass reach), while meeting all of the Proposed Project objectives. Therefore, while the No Project Alternative is the Environmentally Superior Alternative overall, pursuant to CEQA Guidelines section 15126.6, subdivision (e)(2), Alternative 2 is the Environmentally Superior Alternative that fulfills the Proposed Project objectives.

Chapter 6 Cumulative Impacts

A cumulative impact consists of an impact created as a result of the combination of the project evaluated in the EIR, together with other reasonably foreseeable impacts not caused by the proposed project. CEQA Guidelines section 15130 requires an EIR to discuss cumulative impacts of a project when the project's incremental effect is "cumulatively considerable." Used in this context, cumulatively considerable means that the incremental effects of an individual project could be significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effect of probable future projects.

Where the cumulative impact caused by the project's incremental effect and the effects of other reasonably foreseeable projects is not significant, the EIR must briefly indicate why the cumulative impact is not significant.

6.1 Approach

Section 15130 of the CEQA Guidelines permits two different methodologies for analysis of cumulative impacts:

The "list" approach permits the use of a list of past, present, and probable future projects producing related or cumulative impacts, including projects both within and outside the project area; and

The "projections" approach allows the use of a summary of projections contained in an adopted plan or related planning document, such as a regional transportation plan, or in an EIR prepared for such a plan. The projections may be supplemented with additional information such as regional modeling.

The analysis in this EIR is based on a combination of the list and projections approaches, using the land use designations and/or projections of local agencies, in combination with known other relevant projects in the area. The Proposed Project is located in the Tehama County General Plan Eastern Planning Area. The general area that was considered in the cumulative impact analysis is Tehama County. Tehama County projects were examined for their potential to result in a cumulative impact when combined with the Proposed Project. These are listed in Table 6–1.

Table 6–1. Projects Included in the Cumulative Impact Analysis

Project Name/Location	Approximate Distance from Project	Project Type	Status
Clear Recovery Zone/ Tehama County I–5	22 miles west	Improves site distances along I–5 near the Nine Mile/Hooker Creek overcrossing	Notice of Exemption has been filed (April 2020)
AT&T LightGuide Fiber Optic Cable Repair Phase 2/Tehama County	24 miles west	Small Habitat Restoration Proposed Project	Notice of Exemption has been filed (April 2020)

Project Name/Location	Approximate Distance from Project	Project Type	Status
Champlin Slough Bridge Replacement SR 99/Tehama County	36 miles southwest	Bridge replacement	Negative Declaration is currently being circulated (April 2020)
2017 Storm Damage Rehabilitation Site 80: Deer Creek Levee Erosion Repair (near Vina)/Tehama County	36 miles southwest	Levee repair	Mitigated Negative Declaration (March 2020)
Jelly's Ferry Bridge Replacement/Tehama County	18 miles west	Bridge replacement	Approved March 2020
Grant Street Drainage Project/ Tehama County	30 miles southwest	Drainage improvements	Out to bid

Sources: OPR 2020; Tehama County Public Utilities, 2020

The impact discussions in Chapter 4 explain the geographic scope of the area affected by each cumulative effect (e.g., immediate Proposed Project vicinity, county, watershed, air basin, etc.). The geographic area considered for each cumulative impact depends upon the impact that is being analyzed. For example, in assessing aesthetic impacts, the pertinent geographic study area is the vicinity of the Proposed Project from which the new development can be publicly viewed and may contribute to a significant cumulative visual effect. In assessing macro–scale air quality impacts, on the other hand, all development within the air basin contributes to regional emissions of criteria pollutants, and basin–wide projections of emissions is the best tool for determining the cumulative effect.

6.2 Cumulative Impact Setting

The following provides a summary of the cumulative impact setting for each impact area:

- *Aesthetics*: The cumulative setting for visual impacts that can be publicly viewed includes the effects of the Proposed Project together with other development projects in Tehama County.
- *Agricultural and Forest Resources*: The cumulative setting for agricultural and forest resources considers the effects of the Proposed Project when considered along with other projects in Tehama County.
- *Air Quality*: The cumulative air quality setting is based on the regional growth within the Northeastern Plateau Air Basin.
- *Biological Resources – Aquatics and Fisheries*: The cumulative setting for aquatics and fisheries includes South Fork Battle Creek Basin, which is part of the Sacramento River Basin.
- *Biological Resources – Terrestrial*: The cumulative setting for terrestrial resources includes other projects within Tehama County.

- *Cultural and Tribal Cultural Resources*: The cumulative setting for cultural and tribal resources is the area defined by FERC as the Area of Potential Effect (APE), which corresponds with the SHPO's Proposed Project Area Limits (PAL).
- *Energy*: The cumulative energy setting relates to state–wide use of energy resources.
- *Geology and Soils*: The cumulative setting for geology and soils includes other projects within Tehama County.
- *Greenhouse Gas Emissions*: The cumulative greenhouse gas setting is based on the regional growth within the Northeastern Plateau Air Basin, as well as considering state–wide greenhouse gas emissions estimates.
- *Hazards and Hazardous Materials*: The cumulative setting for hazards and hazardous materials includes other projects within Tehama County.
- *Hydrology and Water Quality*: The cumulative setting for hydrology and water quality includes South Fork Battle Creek Basin, which is part of the Sacramento River Basin.
- *Land Use and Planning*: The cumulative setting for land use and planning considers the effects of the Proposed Project when considered along with other projects in Tehama County that are pending.
- *Noise*: The analysis of potential cumulative noise impacts from construction and stationary sources considers the Proposed Project along with projects in the immediate vicinity of the Proposed Project.
- *Recreation*: The cumulative setting for recreation considers includes other projects within Tehama County.
- *Transportation*: The cumulative setting for traffic and circulation includes other projects within Tehama County.
- *Wildfire*: The area considered for cumulative impacts related to wildfire is Tehama County, focusing on the State Responsibility Area and the Very High Fire Hazard Severity Zone, as defined by Caltrans. In addition, the CPUC's Tier 2 designation is considered.

6.3 Cumulative Effects

As described in Chapter 4, for agricultural and forest resources, land use and planning, mineral resources, population and housing, public services, and utilities and public services, either the Proposed Project has no impacts or the impacts are so minor they will have no contribution to cumulative impacts in the Proposed Project area.

Implementation of Applicant–proposed environmental protection measures and other environmental management plans will minimize impacts to less–than–significant levels related to cultural and tribal resources, geology and soils, hazards and hazardous materials, and hydrology and water quality. These issues are addressed below.

6.3.1 Cultural and Tribal Resources

A project's impacts with respect to cultural resources are generally site specific and will not affect or be affected by other development in the region. Given past investigations in the region, cultural resources are likely to be present at some of the project sites evaluated for cumulative impacts. However, the projects on Table 6–1 are replacement and improvement projects on sites that have been previously disturbed. Nonetheless, mitigation will be provided, as needed on an individual project basis by examining specific project circumstances, in accordance with state and local requirements and other environmental analyses. With Rugraw's implementation of the Historic Properties Management Plan (HPMP) and compliance with the Programmatic Agreement, as discussed in Section 4.8, Cultural Resources, and Section 4.9, Tribal Resources, the Proposed Project will not result in significant impacts on cultural resources. Therefore, the Proposed Project's incremental effects are not cumulatively considerable when viewed in connection with the effects of the other projects evaluated.

6.3.2 Geology and Soils

A project's impacts with respect to geology and soils are generally site specific and will not affect or be affected by other development in the region. As with the Proposed Project, erosion could occur during construction grading or other site preparation activities associated with other projects, which could cumulatively contribute to localized soil erosion and the resultant siltation of local creeks. Environmental review has been or will presumably be conducted for each of the other identified projects as was done for the Proposed Project. Impacts of individual projects will be mitigated by compliance with city and county development standards. The Proposed Project will include implementation of several General Construction Measures, which include a Stormwater Pollution Prevention Plan (SWPPP), and best management practices (BMPs) related to protection of water quality (see *Section 4.10, Geology and Soils*). In addition, the HPMP is required to address any unique paleontological or geologic features found during construction. The Proposed Project's incremental effects are not cumulatively considerable when viewed in connection with the effects of the other projects evaluated.

6.3.3 Hazards and Hazardous Materials

As analyzed in *Section 4.12, Hazards and Hazardous Materials*, the Proposed Project could result in impacts related to transportation, use, storage and disposal of hazardous materials. With implementation of Proposed Project General Construction Measures, Biological Resources Protection Measures, and Environmental Management and Monitoring Plans, these impacts will be minimized. Implementation of projects identified in Table 6–1 will also result in the handling of hazardous materials, and to a minor extent will result in a temporary increase in hazardous materials transport, use, and disposal. Although there is some potential for accidental release of hazardous materials, the risk will be minimized for those projects through compliance with federal, state, and local regulations, inclusive of project–specific SWPPPs and BMPs where applicable. If an accidental release of hazardous materials were to occur, the applicable measures and BMPs for those projects will be implemented. In addition, such a release will likely be a short–term event, and will not have a cumulatively considerable impact. Adherence to regulations will preclude activities that could lead to long–term, cumulative impacts related to the handling and/or use of hazardous materials. Therefore, the Proposed Project's incremental effects are not cumulatively considerable when viewed in connection with the effects of the other projects evaluated.

6.3.4 Hydrology and Water Quality

As analyzed in *Section 4.13, Hydrology and Water Quality*, implementation of the Proposed Project will result in changes to the hydrologic features in the area, such as streamflow regime, surface hydrology, drainage patterns, and surface flows. The Proposed Project will not affect groundwater. In addition, the Proposed Project could affect water quality in the short–term as a result of increased turbidity as a function of construction activities, accidental spills of hazardous materials from construction vehicles, and increase in turbidity associated with stormwater runoff. However, the impacts to water quality will be temporary in nature, and in the long term there will be no change in turbidity compared to current conditions. However, implementation of General Construction Measures, Biological Resources Protection Measures, and Environmental Management and Monitoring Plans will minimize impacts to the hydrology and water quality resulting from the Proposed Project.

As with the Proposed Project, hydrology and water quality impacts could occur during construction grading or other site preparation activities associated with the projects listed in Table 6–1. Environmental review has been or will presumably be conducted for each of these projects as was done for the Proposed Project. Projects identified in Table 6–1 will also be required to implement SWPPPs and BMPs as needed, to avoid adverse impacts. The Proposed Project's incremental effects are not cumulatively considerable when viewed in connection with the effects of the other projects evaluated.

For some resource issue areas, including air quality, energy, GHG, noise, transportation, and wildfire, the Proposed Project does not include any specific measures to address identified significant impacts. As detailed in Chapter 4, mitigation measures are required to reduce these impacts to less–than–significant levels. Cumulative impacts in these resource areas are discussed below.

6.3.5 Air Quality

Impact 4.5–2 analyzes potential cumulative impacts to air quality that could occur from construction, operation, and maintenance of the Proposed Project in combination with regional growth projections in the air basin. The replacement and improvement projects in the area will generate air emissions due to construction. As with the Proposed Project (AIR–1), applicants must comply with local and regional air quality standards, which require, if necessary, project–specific mitigation measures. These will include dust suppression, minimizing idling of construction equipment, and other measures to reduce air quality emissions, Therefore, the Proposed Project's incremental effects are not cumulatively considerable when viewed in connection with the effects of the other projects evaluated.

6.3.6 Energy

As a hydroelectric facility generating renewable energy, the Proposed Project will serve to directly advance state energy mandates. During the Proposed Project's lifetime of operation, it will generate 24,936 MWhs of renewable energy annually into the electric grid. Compliance with federal, state, and local energy mandates for new construction will minimize the Proposed Project's operational energy use (see Impact 4.8–1). The projects identified in Table 6–1 will likely not require additional energy resources for operation and maintenance since they are replacement and improvement projects of existing facilities.

Construction of the Proposed Project and other projects will also require energy consumption. Environmental review has been or will presumably be conducted for each of the projects as was done for the Proposed Project. Energy impacts of individual projects will be mitigated by compliance with applicable state and local energy conservation measures. Since the Proposed Project will generate energy overall, and other projects will be mitigated as needed, the Proposed Project's incremental use of energy will not be cumulatively considerable when viewed in connection with the effects of the other projects evaluated.

6.3.7 Greenhouse Gas Emissions

The Proposed Project's amortized GHG emissions from construction will be 33 MT CO_2e per year, which is below the GAAQI screening threshold of 900 MT CO2e per year. This is considered to be a less–than–significant impact. The projects in Table 6–1 will replace and improve existing facilities. Construction GHG emissions associated with these projects will be substantially less than the Proposed Project, thus also falling below the GAAQI screening threshold. Therefore, the Proposed Project's incremental effects from construction are not cumulatively considerable when viewed in connection with the effects of the other projects evaluated.

However, the Proposed Project has potential to contribute to GHG emissions if gas insulated equipment (GIE) is used (Impact 4.11–1). The use of GIE emits sulfur hexafluoride (SF_6), a GHG. The projects listed in Table 6–1 will likely not use GIE, or if it is required, will likely be exempt from CARB's regulation of SF_6 since only replacement and improvement of existing facilities will occur. Therefore, the Proposed Project's incremental effects from operation and maintenance are not cumulatively considerable when viewed in connection with the effects of the other projects evaluated

6.3.8 Noise

Implementation of the Proposed Project combined with projects identified in Table 6–1 could result in construction–related noise temporarily exceeding noise thresholds identified in local plans, policies, and ordinances. All construction activities for the Proposed Project will be short–term. The work sites are primarily remote and in scarcely populated unincorporated areas, and will not result in significant increases in ambient noise levels. However, the Proposed Project will create significant noise impacts related to installation of the transmission line near a residential area. For the areas immediately adjacent to construction activities, mitigation measures are required to minimize the effect of increased temporary noise. As discussed in *Section 4.15, Noise* (Impact 4.15–1), these measures require that construction be limited to 7 AM to 7 PM, Monday through Friday, except holidays, and that construction equipment is not left idling and is sufficient distance from any sensitive receptors. In addition, the Proposed Project could impact wildlife due to noise associated with construction. However, as discussed in *Section 4.7, Biological Resources – Terrestrial,* proposed measures and plans will minimize the effects of noise on wildlife (Impact 4.7–1).

Environmental review has been or is expected to be conducted for each of project identified in Table 6–1, as was done for the Proposed Project. Projects identified in Table 6–1 will also be evaluated for potential noise impacts and required to implement SWPPPs and BMPs as needed to avoid adverse impacts on a project specific basis to minimize temporary construction–related

noise. The Proposed Project will not increase or create any new sources of operational noise; and therefore, cumulative operational noise impacts will also be less than significant.

6.3.9 Transportation

The Proposed Project will involve temporary increases in traffic during construction. The primary source of traffic will be use of heavy equipment to and from the site, as well as construction worker commute trips. Heavy equipment will be staged onsite and therefore equipment will generally make one roundtrip to and from the site. As discussed in Impact 4.17–3, construction could delay or impair area evacuation routes. With implementation of TRANS–1, which requires the implementation of a Wildfire Mitigation Plan that includes coordinating with emergency providers to ensure access is maintained if road closures are required, these impacts will be minimized. Proposed Project operation will generate a minimum amount of traffic, associated with three personnel.

Construction of the projects in Table 6–1 could also delay or impair area evacuation routes. As with the Proposed Project, environmental review has been or will presumably be conducted for each project. Impacts of individual projects will be mitigated by compliance with city and county construction permit requirements, such as a construction traffic management plan, that will ensure emergency vehicles will not be affected.

Due to the short–term nature of construction activities and the minor increase in traffic resulting from personnel, impacts to the local circulation network resulting from the Proposed Project plus cumulative projects will be less than significant. Therefore, the Proposed Project's incremental effects are not cumulatively considerable when viewed in connection with the effects of the other projects evaluated.

6.3.10 Wildfire

The California Department of Forestry and Fire Protection has identified the Proposed Project area as being in a Very High Fire Hazard Severity Zone, which is defined as an area at extreme risk for wildfires. Construction activities, as well as ongoing operation and maintenance of Proposed Project structures, could provide a source of ignition for a fire (e.g. diesel and fuel powered vehicles, welding or cutting, etc.) and thus have the potential to increase the risk of wildland fire occurrence. Any wildfire in the Proposed Project vicinity could threaten infrastructure and people in the vicinity. In addition, transmission lines have been the source of several recent and historically large fires in California. Electric generation and related utility companies have been under increased scrutiny in regard to fire safety practices, especially related to vegetation clearing around infrastructure. Per the California Public Utilities Commission (CPUC) utilities are required to submit a Wildfire Mitigation Plan (WMP) in compliance with Senate Bill 901 and with direction from the CPUC. The Proposed Project will implement a WMP detailing wildfire protection and prevention measures and procedures during all phases of the Proposed Project, including construction, operation, and maintenance.

Depending on the location of the projects listed in Table 6–1 within Tehama County and the project area's potential for wildland fire, other projects may increase the risk of wildfire if protection and prevention measures are not implemented. Environmental review has been or is expected to be conducted for each of the projects identified in Table 6–1, as was done for the Proposed Project. Projects identified in Table 6–1 will also be evaluated for the potential to increase wildfire risk. However, since the projects are restoration and improvement of existing facilities in

areas already cleared or maintained by the County, the risk of fire hazard will be low. Although fire hazard in the area will remain high, the Proposed Project's incremental effects are not cumulatively considerable when viewed in connection with the effects of the other projects evaluated.

For biological resources (both aquatic and terrestrial), Rugraw's proposed measures and plans will partially mitigate identified impacts, but not to less–than–significant levels. As identified in *Section 4.6, Biological Resources – Aquatic and Fisheries* and *Section 4.7, Biological Resources – Terrestrial,* mitigation measures are required. Cumulative impacts in these resource areas are discussed below.

6.3.11 Biological Resources – Aquatic and Fisheries

The Proposed Project will result in significant impacts related aquatics and fisheries, as analyzed in Section 4.6. However, with implementation of Rugraw's proposed measures and plans, and Mitigation Measures AQU–1 through AQU–4, impacts will be reduced to less than significant. These mitigation measures require modifications to proposed measures and plans to address additional water quality monitoring and compliance, and protection of foothill yellow–legged frog.

The projects listed in Table 6–1 involve restoration and improvement of existing facilities located within or near waterbodies. Construction, operation and maintenance activities could create impacts to aquatic species. Environmental review has been or is expected to be conducted for each of these projects as was done for the Proposed Project. As with the Proposed Project, SWPPPs and BMPs will be implemented as needed to avoid adverse impacts. In addition, any agency permits that may be required, such as a CDFW Streambed Alteration Agreement, will include necessary protective measures. Therefore, the Proposed Project's incremental effects are not cumulatively considerable when viewed in connection with the effects of the other projects evaluated.

6.3.12 Biological Resources – Terrestrial

The Proposed Project will result in significant impacts to terrestrial resources, as analyzed in Section 4.7. However, with implementation of Rugraw's proposed measures and plans, and Mitigation Measures BIO–1 through BIO–4, impacts will be reduced to less than significant. These mitigation measures require modifications to proposed measures and plans to address protection of special–status and listed plants and animals and their habitats, and minimize the spread of noxious weeds.

As with the Proposed Project, the restoration and improvement projects could also affect terrestrial resources from construction, operation and maintenance activities. Environmental review has been or is expected to be conducted for each of these projects as was done for the Proposed Project. As with the Proposed Project, protective measures will be implemented as needed to avoid adverse impacts. In addition, any agency permits that may be required, such as a CDFW Streambed Alteration Agreement, will include necessary protective measures. Therefore, the Proposed Project's incremental effects are not cumulatively considerable when viewed in connection with the effects of the other projects evaluated.

For aesthetic impacts, the Applicant's proposed measures will partially mitigate identified impacts, but not to less–than–significant levels. As detailed in *Section 4.3, Aesthetics*, there is

no mitigation available to reduce aesthetic impacts of the transmission line to less than significant, as described below.

6.3.13 Aesthetics

Due to the generally forested condition of the areas surrounding the various Proposed Project elements, most of the scenic opportunities are substantially limited or are non–existent, and most Proposed Project elements are located either on private property, away from public roadways, or are too remote to be seen by the viewing public. The exception is the portion of the transmission line in the Town of Manton. The transmission line will be highly visible and apparent to the nearby residences, which is identified as a significant and unavoidable impact for the Proposed Project (Impact 4.3–3). With exception of the transmission line immediately adjacent to existing residences, potential impacts related to aesthetics will be less than significant, some of which will be further minimized with implementation of Rugraw–proposed measures.

The aesthetic and visual resource impacts of individual projects can often be mitigated through site and landscape design, avoidance of significant visual features, and compliance with city and county development standards. As noted above, the projects in Table 6–1 are replacement and improvement projects and will likely not contribute to degradation of visual quality in the area since no new structures will be constructed. However, since the Proposed Project results in a significant and unavoidable impact, any change in the visual environment, albeit minor, could contribute to significant cumulative aesthetic impacts.

6.3.14 References

Office of Planning and Research (OPR). 2020. Ceqanet. Found at: ceqanet.opr.ca.gov

Pacific Gas and Electric Company (PG&E). 2020. Delivering Low–Emission Energy. Found at: www.pge.com

Tehama County Public Works Department. 2020. Current Projects. Found at: www.tehamacountypublicworks.ca.gov

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Chapter 7 CEQA–Mandated Sections

This chapter provides an overview of the impacts of the Proposed Project based on the analyses presented in Chapter 4 of this Draft Environmental Impact Report (EIR). The topics covered in this chapter include impacts found not to be significant, significant irreversible changes, and growth–inducing impacts.

7.1 Impacts Found Not to be Significant

CEQA Guidelines section 15128 allows environmental issues for which there is no likelihood of significant impact to be "scoped out" and not analyzed further in the Draft EIR. This section explains the reasoning by which it was determined that, for Geology and Soils, Greenhouse Gas Emissions, Hazards and Hazardous Materials, Hydrology and Water Quality, Mineral Resources, Population and Housing, Public Services, and Recreation, there would either be no impacts potentially resulting from construction of the Proposed Project or else the potential impacts would be less than significant.

7.1.1 Mineral Resources

The most common mineral resources in Tehama County include chromium, copper, manganese, gold, and silver. Within the Proposed Project area, one prospect mine (Joe Arnol Prospect) is located in Manton, California, west of the transmission line proposed along Manton School Road (The Diggings™, 2020). No other active mines or claims are present within the Proposed Project area.

The Proposed Project would not require the extraction or use of any mineral resources. Although the Joe Arnol Prospect is located adjacent to the proposed transmission line, all construction and operation of the line would occur within the existing road right–of–way (ROW), and therefore would not 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. Since no other mineral resources have been identified, the Proposed Project would not 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.

Therefore, no impacts related to mineral resources would occur.

7.1.2 Population and Housing

The Proposed Project would employ approximately 30 people during peak construction. It is anticipated that these contract workers would be Tehama County residents and individuals who would relocate temporarily to the area. Following construction, three full–time jobs are expected to be maintained for the operational life of the Proposed Project.

Red Bluff and Redding are within commuting distance of the Proposed Project. It is expected a large portion of the skilled workforce would commute from those areas. In 2015, the housing vacancy rate was 12.9 percent, suggesting there is adequate available housing to meet Proposed Project needs (FERC, 2018), both during peak construction and the permanent workforce. The Proposed Project would not displace existing people or housing. Therefore, the Proposed Project would not result in the need to construct new housing. Therefore, no impacts

related to population and housing would occur. For a discussion of growth–inducing impacts see Section 7.3, Growth–Inducing Impacts.

7.1.3 Public Services

Proposed Project facilities would not rely heavily on or involve public services such as police, schools, and parks, due to the nature of the Proposed Project as a hydroelectric power facility. Temporary construction–related increases in population (up to 30 during the construction period) and the addition of three permanent personnel to maintain and operate the Proposed Project would be considered minor. The Proposed Project would not expand upon the service area of existing service providers. Any increase in demand on local service providers associated with the Proposed Project is expected to be minimal.

Proposed Project facilities would rely on existing fire protection services. According to the Fire Safety and Sheriff Protection Element of the Shasta County General Plan, fire protection services are provided by both the Shasta County Fire Department and California Department of Forestry and Fire Protection (CAL FIRE). Issues related to adequate emergency response and wildfire are addressed in Section 4.12, Hazards and Hazardous Materials, Section 4.17, Transportation and Section 4.19, Wildfire.

Overall, existing service providers would be able to meet the needs of the local population and construction–related population without the need for new or physically altered governmental facilities. The Proposed Project would not generate a substantial new population or impede or increase response times for police protection, or other public services, and would not require that any existing government facilities (including schools or parks) be built or altered.

Therefore, no impacts would occur related to these public services.

7.1.4 Utilities and Service Systems

Proposed Project facilities would not rely on utilities and service systems due to the nature of the Proposed Project as a hydroelectric power facility. Temporary construction–related increases in population (up to 30 during the peak construction period) and the addition of three permanent personnel to maintain and operate the Proposed Project would be considered minor. Overall, existing service providers would be able to meet the needs of the local population and construction–related population without the need for relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities other than the Proposed Project itself, as noted above. Any solid waste generated during construction would be considered minor and disposal is required to comply with federal, state, and local statutes regarding solid waste. Therefore, the Proposed Project would not require new construction or improvements to utilities and service systems that could create significant environmental effects.

No impacts would occur related to utilities and service systems.

7.2 Significant and Unavoidable Impacts

As discussed in *Section 4.3, Aesthetics*, residents located along Hazen Road and South Powerhouse Road would have near–distance views of the transmission line. It should be noted that to address the concerns of the residents of Manton related to the transmission line, Rugraw relocated the originally proposed alignment to limit the number of residents who would be

affected. It is expected that viewers would have a partially screened view toward the transmission line, but the visibility would be high due to the close distance of the view.

Although existing mature trees and other vegetation between the transmission line and residences would screen most views, the addition of a man–made structure to the existing rural visual environment currently experienced by residents would be considered adverse. The route was adjusted to limit impacts as much as possible, but there are no measures available that would reduce the impact to less than significant. Therefore, the addition of the transmission line would be considered a significant and unavoidable impact.

In addition, the EIR identifies significant and unavoidable impacts to aquatic biological resources (Section 4.6.6), terrestrial biological resources (Section 4.7.4), and hydrology and water quality (Section 4.13.6). In these areas, the EIR also identifies recommended measures that, if implemented, would reduce impacts to less than significant. However, as Rugraw has not affirmatively indicated it would implement the recommended measures, impacts are identified as significant and unavoidable.

7.3 Significant Irreversible Changes

Section 15126.2, subdivision (c) of the CEQA Guidelines requires an EIR to discuss the extent to which a proposed project or plan would commit non–renewable resources to uses that future generation would probably be unable to reverse.

Construction of the Proposed Project would require the manufacture of new materials requiring the use of energy. The production of these materials would result in consumption of natural resources including fossil fuels. The proposed 60-kV transmission line would assist in the delivery of renewable energy, offsetting the energy needed to construct the Proposed Project. However, construction, operation, and maintenance of the transmission line has the potential to increase wildfire risks in the Proposed Project area, as discussed in *Section 4.19, Wildfire*. Under Mitigation Measure FIRE–1, Rugraw is required to implement a Wildfire Mitigation Plan (WMP) that must be approved by the CPUC and CAL FIRE. The WMP is required to address all stages of a project including construction, operation, and maintenance, which would reduce wildfire impacts to less than significant, addressing the potential irreversible loss of resources. The WMP must also be consistent with applicable state laws and regulations for fire prevention and protection, and include identification of fire safety measures, fire prevention and control requirements, and other procedures.

Potential environmental accidents of concern include those that would have adverse effects on the environment or public health due to the nature or quantity of material released during an accident and the receptors exposed to that release. Construction activities associated with development of the Proposed Project would involve some risk for environmental accidents. However, these activities would be monitored by City, State, and federal agencies, and would follow professional industry standards governing the use, storage, transport, and disposal of hazardous materials as identified in this document and all Applicant–proposed measures and other mitigation measures. As a result, the Proposed Project would not pose a substantial risk of accidental release of hazardous materials.

Once constructed, the Proposed Project would not cause a substantial increase in the consumption or use of non–renewable resources. No increases in inefficiencies or unnecessary energy consumption are expected to occur as a direct or indirect consequence of the Proposed

Project. Energy impacts associated with the Proposed Project would not have any measurable effect on per capita energy consumption. The Proposed Project would minimize use of fossil fuels during construction and encourage reliance on renewable energy sources during operation.

7.4 Growth–Inducing Impacts

The discussion on growth–inducing effects must address "ways in which the Proposed Project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment" (CEQA Guidelines, § 15126.2, subd. (d)).

Growth–inducing effects of a proposed project are considered significant if the project directly causes population growth beyond that considered in local and regional land use plans or another relevant population growth projection. Effects would also be significant if a proposed project would provide the means to allow for population growth beyond that considered in local and regional land use plans or another relevant population growth projection.

7.4.1 Growth Caused by Direct and Indirect Employment

There would not be permanent population growth in the area due to direct employment. During peak construction periods, crews may be working simultaneously, with up to 30 people working at one time. It is anticipated that most of the construction workers would come from the local labor pool available in Tehama County, with workers expected to commute to construction sites rather than move to the area. Thus, additional housing to accommodate these workers would not be required.

The operations and maintenance work required for the Proposed Project would be fulfilled by three new permanent jobs. Although jobs would be created, this is considered a minor increase. In addition, the Proposed Project would not modify land use or zoning designations to permit new residential or commercial development and therefore would not foster growth, remove direct growth constraints, or add a direct stimulus to growth. Therefore, the Proposed Project would not result in direct or indirect impacts to population growth.

7.4.2 Growth Related to Provision of Additional Electric Power

The purpose of the Proposed Project is to supply hydroelectric power to meet part of California's power requirements, resource diversity, and capacity needs. Being a renewable resource, the Proposed Project would provide power that may displace generation from non–renewable sources. It is not anticipated that the additional 24,936 MWh per year would be growth inducing or allow substantial unplanned growth in the area. In addition, the small scale of additional employees, during both construction and operation, would not be considered a substantial increase in unplanned population growth in the area. None of the Proposed Project activities would result in displacement of housing or convert non–residential zones to residential zones.

7.4.3 References

FERC. 2018. Final Environmental Impact Statement for Hydropower License, Lassen Lodge Hydroelectric Project, FERC Project Number 12496–002. California. FERC/EIS–0276. FERC, Office of Energy Projects, Washington, D.C.

The Diggings™. 2020. Found at: thediggings.com.

Chapter 8 List of EIR Preparers

8.1 State Water Resources Control Board

Project Manager ..... Savannah Downey

8.2 Cardno, Inc.

Project Manager ..... Kendra Ryan
Deputy Project Manager ..... Jessica Holmes
Aesthetics ..... Kendra Ryan
Agriculture and Forest Resources ..... Krista Nightengale/Jennifer Scholl
Air Quality ..... Elizabeth Sheppard
Biological Resources – Aquatic and Fisheries ..... Craig Addley
Biological Resources – Terrestrial ..... Janelle Nolan & Associates, Sara Reece
Cultural Resources ..... Brian Marks
Energy ..... Elizabeth Sheppard
Geology / Soils ..... Jessica Holmes
Greenhouse Gas Emissions ..... Elizabeth Sheppard
Hazards / Hazardous Materials ..... Krista Nightengale/Jennifer Scholl
Hydrology / Water Quality ..... Jessica Holmes/Craig Addley
Land Use / Planning ..... Krista Nightengale/Jennifer Scholl
Noise ..... Kendra Ryan
Recreation ..... Kendra Ryan
Transportation ..... Kendra Ryan
Tribal Cultural Resources ..... Brian Marks
Wildfire ..... Kendra Ryan
Alternatives ..... Kendra Ryan/Craig Addley/Ed Bianchi
CEQA–Mandated Sections/Cumulative ..... Kendra Ryan
GIS Manager ..... Anna Clare
Production Supervisor ..... Iris Eschen

8.3 Janelle Nolan & Associates

Senior Consultant ..... Sara Reece

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Lassen Lodge
Hydroelectric Project
(FERC Number 12496)

APPENDIX A

SCOPING AND PUBLIC INVOLVEMENT

2015022043

Notice of Preparation

To: State Clearinghouse
1400 Tenth Street
Sacramento, CA 95814
(Address)

From: State Water Resources Control Board
Divison of Water Rights - P.O. Box 2000
Sacramento, CA 95812-2000
(Address)

Subject: Notice of Preparation of a Draft Environmental Impact Report

State Water Resources Control Board will be the Lead Agency and will prepare an environmental impact report for the project identified below. We need to know the views of your agency as to the scope and content of the environmental information which is germane to your agency's statutory responsibilities in connection with the proposed project. Your agency will need to use the EIR prepared by our agency when considering your permit or other approval for the project.

The project description, location, and the potential environmental effects are contained in the attached materials. A copy of the Initial Study (☐ is ☒ is not) attached.

Due to the time limits mandated by State law, your response must be sent at the earliest possible date but not later than 30 days after receipt of this notice.

Please send your response to Michelle Lobo at the address shown above. We will need the name for a contact person in your agency.

Project Title: Lassen Lodge Hydroelectric Project

Project Applicant, if any: Rugraw, LLC

Date FEB 10 2015

Signature

Title Water Quality Certification Program Manager

Telephone (916) 327-3117, Michelle Lobo

Reference: California Code of Regulations, Title 14, (CEQA Guidelines) Sections 15082(a), 15103, 15375.

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FEB 10 2015
STATE CLEARING HOUSE

Print Form

Appendix C

Notice of Completion & Environmental Document Transmittal

2015022043

Mail to: State Clearinghouse, P.O. Box 3044, Sacramento, CA 95812-3044 (916) 445-0613
For Hand Delivery/Street Address: 1400 Tenth Street, Sacramento, CA 95814

SCH #

Project Title: Lassen Lodge Hydroelectric Project (Federal Energy Regulatory Commission (FERC) Project No. 12496)

Lead Agency: State Water Resources Control Board,Division of Water Rights Contact Person: Michelle Lobo

Mailing Address: P.O. Box 2000 Phone: (916) 327-3117

City: Sacramento Zip: 95812-2000 County: Sacramento

Project Location: County: Tehama City/Nearest Community: Manton/Mineral

Cross Streets: Zip Code:

Longitude/Latitude (degrees, minutes and seconds): 40 ° 21 ′ 8.41 ″ N / 121 ° 39 ′ 22.3 ″ W Total Acres: 729.85

Assessor's Parcel No.: 013-200-07, -08, -09, and -11 Section: 18-21 Twp.: T29N Range: R3E Base:

Within 2 Miles: State Hwy #: 36 Waterways: South Fork Battle Creek

Airports: Railways: Schools: Manton Elementary

Document Type:

CEQA: ☒ NOP ☐ Draft EIR NEPA: ☐ NOI Other: ☐ Joint Document
☐ Early Cons ☐ Supplement/Subsequent EIR ☐ EA ☐ Final Document
☐ Neg Dec (Prior SCH No.) ☐ Draft EIS ☐ Other:
☐ Mit Neg Dec Other: ☐ FONSI

Local Action Type:

☐ General Plan Update ☐ Specific Plan ☐ Rezone ☐ Annexation
☐ General Plan Amendment ☐ Master Plan ☐ Prezone ☐ Redevelopment
☐ General Plan Element ☐ Planned Unit Development ☐ Use Permit ☐ Coastal Permit
☐ Community Plan ☐ Site Plan ☐ Land Division (Subdivision, etc.) ☐ Other:

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Development Type:

☐ Residential: Units Acres
☐ Office: Sq.ft. Acres Employees
☐ Commercial: Sq.ft. Acres Employees
☐ Industrial: Sq.ft. Acres Employees
☐ Educational:
☐ Recreational:
☐ Water Facilities: Type MGD

☐ Transportation: Type
☐ Mining: Mineral
☒ Power: Type New Hydroelectric MW 5
☐ Waste Treatment: Type MGD
☐ Hazardous Waste: Type
☐ Other:

Project Issues Discussed in Document:

☒ Aesthetic/Visual ☐ Fiscal ☒ Recreation/Parks ☒ Vegetation
☐ Agricultural Land ☐ Flood Plain/Flooding ☒ Schools/Universities ☒ Water Quality
☒ Air Quality ☒ Forest Land/Fire Hazard ☐ Septic Systems ☐ Water Supply/Groundwater
☒ Archeological/Historical ☐ Geologic/Seismic ☐ Sewer Capacity ☒ Wetland/Riparian
☒ Biological Resources ☐ Minerals ☒ Soil Erosion/Compaction/Grading ☒ Growth Inducement
☐ Coastal Zone ☒ Noise ☐ Solid Waste ☐ Land Use
☒ Drainage/Absorption ☐ Population/Housing Balance ☒ Toxic/Hazardous ☒ Cumulative Effects
☐ Economic/Jobs ☐ Public Services/Facilities ☒ Traffic/Circulation ☐ Other:

Present Land Use/Zoning/General Plan Designation:

Tehama County General Plan Land Use Designations include: Upland Ag; Rural Large Lot; Rural Small Lot; Timber; and Public.

Project Description: *(please use a separate page if necessary)*

The State Water Resources Control Board (State Water Board) plans to prepare an Environmental Impact Report for Rugraw, LLC's (Rugraw) Lassen Lodge Hydroelectric Project (Project); FERC Project No. 12496. The proposed Project will be located on South Fork Battle Creek in Tehama County, California. Project facilities include: diversion works, a pipeline and penstock, transition structure, one powerhouse with a turbine/generator, tailrace, substation, station service line, transmission line, switchyard, and multipurpose areas. On May 20, 2014, in accordance with section 401 of the Clean Water Act, Rugraw applied to the State Water Board for a water quality certification. For details, see Project description under Related Documents at: http://www.waterboards.ca.gov/waterrights/water_issues/programs/water_quality_cert/lassen_lodge_ferc12496/

Note: The State Clearinghouse will assign identification numbers for all new projects. If a SCH number already exists for a project (e.g. Notice of Preparation or previous draft document) please fill in.

Revised 2010

Reviewing Agencies Checklist

Lead Agencies may recommend State Clearinghouse distribution by marking agencies below with and "**X**".
If you have already sent your document to the agency please denote that with an "**S**".

X	Air Resources Board	X	Office of Historic Preservation
X	Boating & Waterways, Department of		Office of Public School Construction
	California Emergency Management Agency	X	Parks & Recreation, Department of
	California Highway Patrol		Pesticide Regulation, Department of
	Caltrans District #		Public Utilities Commission
	Caltrans Division of Aeronautics	X	Regional WQCB # 5R
	Caltrans Planning	X	Resources Agency
	Central Valley Flood Protection Board		Resources Recycling and Recovery, Department of
	Coachella Valley Mtns. Conservancy		S.F. Bay Conservation & Development Comm.
	Coastal Commission		San Gabriel & Lower L.A. Rivers & Mtns. Conservancy
	Colorado River Board		San Joaquin River Conservancy
	Conservation, Department of		Santa Monica Mtns. Conservancy
	Corrections, Department of		State Lands Commission
	Delta Protection Commission		SWRCB: Clean Water Grants
	Education, Department of		SWRCB: Water Quality
X	Energy Commission		SWRCB: Water Rights
X	Fish & Game Region # 1		Tahoe Regional Planning Agency
	Food & Agriculture, Department of		Toxic Substances Control, Department of
X	Forestry and Fire Protection, Department of		Water Resources, Department of
	General Services, Department of		
	Health Services, Department of	X	Other: Tehama County Planning Department
	Housing & Community Development		Other:
X	Native American Heritage Commission		

Local Public Review Period (to be filled in by lead agency)

Starting Date February 10, 2015 Ending Date March 13, 2015

Lead Agency (Complete if applicable):

Consulting Firm: _____ Applicant: _____
Address: _____ Address: _____
City/State/Zip: _____ City/State/Zip: _____
Contact: _____ Phone: _____
Phone: _____

Signature of Lead Agency Representative: _____ **Date:** FEB 10 2015

Authority cited: Section 21083, Public Resources Code. Reference: Section 21161, Public Resources Code.

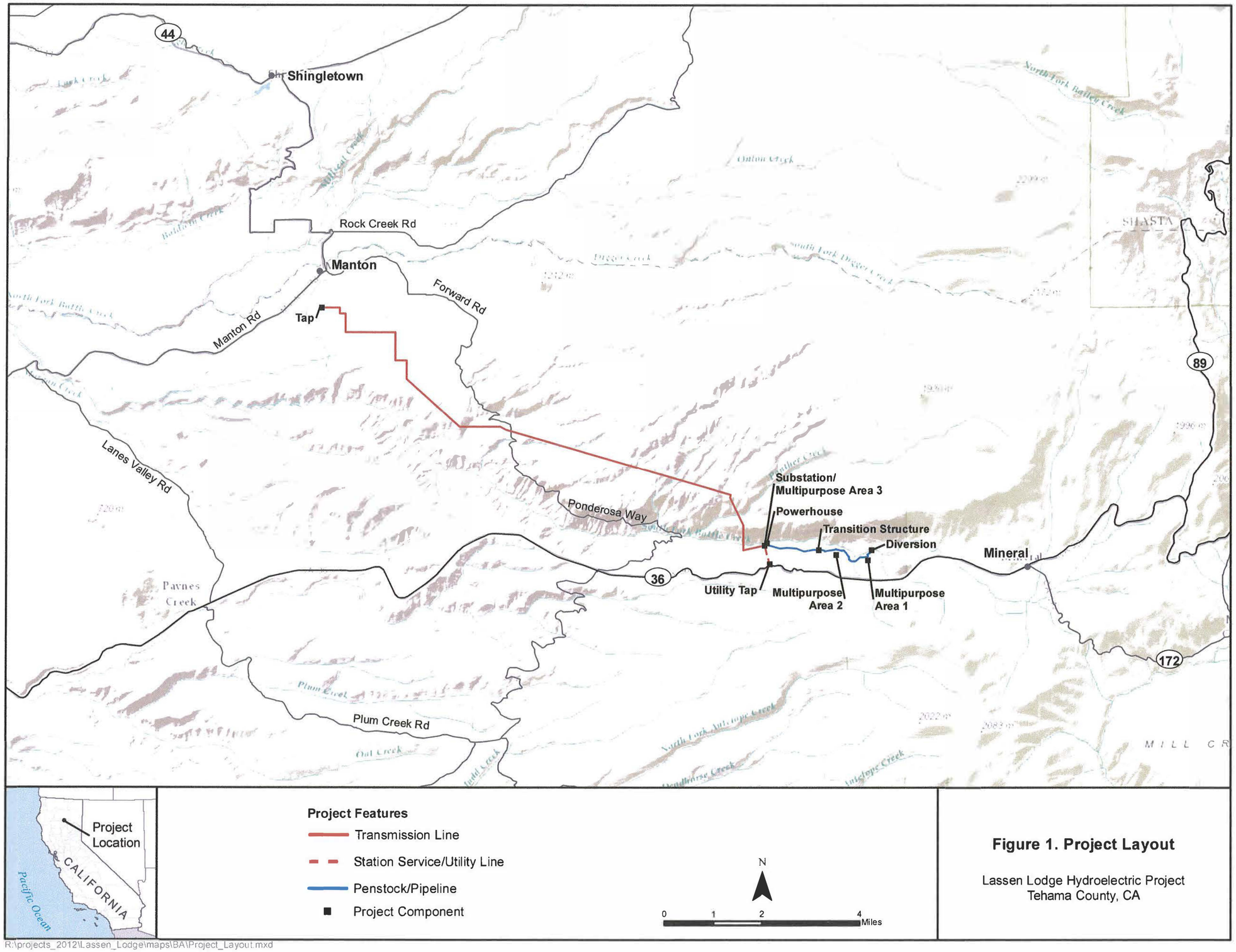

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Figure 1. Project Layout

Lassen Lodge Hydroelectric Project
Tehama County, CA

Substation and Multipurpose Area #3
Powerhouse
Transition Structure
A Line Main Road
Diversion
Multipurpose Area #2
Multipurpose Area #1
Utility Tap
220 A
220 A7
120 A7
120 A
110 A
100 A
Panther Creek
South Fork Battle Creek
Lassen Lodge
Fire Station (CDF)
Cline Ranch
Spring
Paynes Creek
UNDERGROUND TELEPHONE CABLE

EXHIBIT A SHEET OF 4

Figure A-3. Detailed Project Layout

LASSEN LODGE HYDROELECTRIC PROJECT
FERC Project No. 12496

0 0.125 0.25 0.5 Miles

1:17,244 1 inch = 1,437 feet (printed at 11" x 17")

Sheet 1
Sheet 2
Sheet 3
Sheet 4

Project Features

- Transmission Line
- Station Service/Utility Line
- Penstock/Pipeline
- Access Roads

N

PUBLIC NOTICE FOR
CLEAN WATER ACT 401 WATER QUALITY CERTIFICATION
BEFORE THE STATE WATER RESOURCES CONTROL BOARD

An application for water quality certification under section 401 of the Clean Water Act for the following project was filed with the State Water Resources Control Board (State Water Board). California Code of Regulations, title 23, section 3858 requires the Executive Director of the State Water Board to provide public notice of an application at least twenty-one (21) days before taking certification action on the application. Written questions and/or comments regarding the application should be directed to:

Ms. Michelle Lobo
Water Quality Certification Program
Division of Water Rights
State Water Resources Control Board
P.O. Box 2000
Sacramento, CA 95812-2000

RECEIVED:	May 20, 2014
PROJECT:	Lassen Lodge Hydroelectric Project Federal Energy Regulatory Commission Project No. 12496
APPLICANT:	Rugraw, LLC
CONTACT:	Charlie Kuffner
COUNTY:	Tehama
PUBLIC NOTICE:	July 2, 2014
PROJECT STATUS:	Pending

PROJECT DESCRIPTION:

Rugraw, LLC proposes to construct the Lassen Lodge Hydroelectric Project (Project), Federal Energy Regulatory Commission (FERC) Project No. 12496. The proposed Project will have a nameplate capacity of 5 megawatts. The purpose of the proposed Project is to generate electricity through hydropower. Rugraw, LLC filed with FERC a final license application on April 21, 2014, for a major original license.

The proposed Project will be located on the upper South Fork Battle Creek on the western slopes of the Cascade Range. The proposed Project will be approximately 1.5 miles west of the town of Mineral, an unincorporated community in Tehama County. Most of the proposed Project elements will be located on the south side of South Fork Battle Creek.

The proposed Project elements include: diversion dam, intake structure, control/fish screen structure, pipeline and penstock, transition structure, powerhouse, substation, station service line, transmission line, switchyard, and multipurpose areas. Power generated from the proposed Project will be transmitted by a new, approximately 12-mile-long, 60 kilovolt transmission line. The transmission line will interconnect with the Pacific Gas and Electric Volta-South Transmission Line in the town of Manton.

UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Rugraw, LLC Project No. 12496-002

NOTICE OF JOINT SCOPING MEETINGS WITH THE CALIFORNIA STATE WATER RESOURCES CONTROL BOARD AND ENVIRONMENTAL SITE REVIEW AND SOLICITING SCOPING COMMENTS

(October 3, 2014)

Take notice that the following hydroelectric applications have been filed with the Federal Energy Regulatory Commission (FERC or Commission) and are available for public inspection:

a. Type of Application: Major Original License

b. Project No.: 12496-002

c. Date filed: April 21, 2014

d. Applicant: Rugraw, LLC

e. Name of Project: Lassen Lodge Hydroelectric Project

f. Location: On the South Fork Battle Creek, nearby the Town of Mineral, Tehama County, California. No federal lands or Indian reservations are located within the proposed project boundary.

g. Filed Pursuant to: Federal Power Act, 16 USC §§ 791(a) - 825(r).

h. Applicant Contact: Charlie Kuffner, 70 Paseo Mirasol, Tiburon, CA 94920; (415) 652-8553

i. FERC Contact: Adam Beeco at (202)-502-8655; email – adam.beeco@ferc.gov

California State Water Board Contact: Michelle Lobo at (916)-327-3117; email – michelle.lobo@waterboards.ca.gov

j. With this notice, we are soliciting comments on the Commission's staff Scoping Document 1 (SD1). Deadline for filing scoping comments: December 5, 2014 (5:00 pm EST; 2:00 pm PST).

Scoping comments should be filed separately with the Commission and the California State Water Resources Control Board (State Water Board), as noted below.

Commission:

The Commission strongly encourages electronic filing. Please file scoping comments using the Commission's eFiling system at http://www.ferc.gov/docs-filing/efiling.asp. Commenters can submit brief comments up to 6,000 characters, without prior registration, using the eComment system at http://www.ferc.gov/docs-filing/ecomment.asp. You must include your name and contact information at the end of your comments. For assistance, please contact FERC Online Support at FERCOnlineSupport@ferc.gov, (866) 208-3676 (toll free), or (202) 502-8659 (TTY). In lieu of electronic filing, please send a paper copy to: Secretary, Federal Energy Regulatory Commission, 888 First Street, NE, Washington, D.C. 20426. The first page of any filing should include docket number P-12496-002.

The Commission's Rules of Practice and Procedure require all interveners filing documents with the Commission to serve a copy of that document on each person on the official service list for the project. Further, if an intervener files comments or documents with the Commission relating to the merits of an issue that may affect the responsibilities of a particular resource agency, they must also serve a copy of the document on that resource agency.

State Water Board:

Written comments should be provided as noted below. When submitting your comments, provide the contact person's name and phone number. The State Water Board is seeking information regarding what type of environmental document should be prepared (i.e., negative declaration, mitigated negative declaration, or environmental impact report), as well as scoping comments.

State Water Resources Control Board
Division of Water Rights
Water Quality Certification Program
Attention: Michelle Lobo
P.O. Box 2000
Sacramento, CA 95812-2000

Phone: (916) 327-3117
Fax: (916) 341-5400
Email: Michelle.Lobo@waterboards.ca.gov

k. This application is not ready for environmental analysis at this time.

l. The proposed Lassen Lodge Project consists of: (1) a 6-foot-high and 94-foot-long diversion dam; (2) an impoundment of approximately 0.5 acre; (3) a 20 by 10 foot enclosed concrete intake structure; (4) a 7,258-foot-long pipeline and a 5,230-foot-long penstock with a net head of 791 feet; (5) a 50 by 50 foot powerhouse containing one generating unit with a 5,000-kilowatt capacity; (6) a 50 by 50 foot substation area; (7) a 40 by 35 foot switchyard; (8) 100 by 100 foot multipurpose area; and (9) a new 12-mile-long, 60-kilovolt transmission line. The project is estimated to produce approximately 25,000,000 kilowatt hours annually.

m. A copy of the application is available for review at the Commission in the Public Reference Room or may be viewed on the Commission's website at http://www.ferc.gov using the "eLibrary" link. Enter the docket number excluding the last three digits in the docket number field to access the document. For assistance, contact FERC Online Support. A copy is also available for inspection and reproduction at the address in item "h." above.

You may also register online at http://www.ferc.gov/docs-filing/esubscription.asp to be notified via email of new filings and issuances related to this or other pending projects. For assistance, contact FERC Online Support.

n. Scoping Process

The Commission intends to prepare an Environmental Assessment (EA) on the project in accordance with the National Environmental Policy Act. The EA will consider both site-specific and cumulative environmental impacts and reasonable alternatives to the proposed action.

The State Water Board has not determined what type of environmental document it will prepare at this time and is seeking input from agencies and interested parties as part of the scoping process.

Scoping Meetings

In addition to written comments solicited by this SD1, we will hold two public scoping meetings and an Environmental Site Review in the vicinity of the project. A daytime meeting will focus on concerns of the resource agencies, nongovernmental organizations (NGOs), and Indian tribes. An evening meeting will focus on receiving input from the public. We invite all interested agencies, Indian tribes, NGOs, and individuals to attend one or both of the meetings to assist us in identifying the scope of environmental issues that should be analyzed in the EA and the State Water Board's environmental document.

These scoping meetings are being coordinated with the State Water Board and are considered joint scoping meetings for the purposes of both the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA), should the State Water Board prepare an environmental impact report (EIR). (See Cal. Code Regs., tit. 14, §§ 15083, 15223, 15226.) This notice is intended to provide notice of the State Water Board's informal consultation with responsible and trustee agencies pursuant to section 15063 of the CEQA Guidelines as to the potential for the proposed action to cause a significant impact to the environment. (Cal. Code Regs., tit. 14, §15063, subd. (g).) Recipients of this notice are invited to comment on whether an EIR, negative declaration, or mitigated negative declaration should be prepared. In addition, pursuant to CEQA Guidelines section 15083, subdivision (c), these meetings are intended to simultaneously serve the purposes identified in California Code of Regulations, title 14, section 15082, subdivision (c). Any responsible or trustee agency or other interested parties that believes an EIR should be prepared should identify the scope and content of any environmental information it believes should be required, should the State Water Board prepare an EIR.

The times and locations of the meetings are as follows:

Daytime Scoping Meeting

Date and Time:	Wednesday, November 5, 2014, 9:00 AM (PST)
Location:	Cal/EPA Building at 1001 I Street, Sacramento, California. Byron Sher Auditorium on the 2nd floor
Phone number:	Michelle Lobo - (916) 327-3117
Webcast:	http://www.calepa.ca.gov/Broadcast/

Paid parking is available in the parking garage across from the Cal/EPA Building. Metered parking is available on nearby and adjacent streets. Information on traveling to the Cal/EPA Building is available online at:

http://www.calepa.ca.gov/EPABldg/location.htm.

Please enter the Cal/EPA Building through the public entrance at the corner of 10th Street and I Street. Once you enter the building, go to the Visitor's Center located on the left. You will need to sign-in at the Visitor's Center and receive a badge for the 1st and 2nd floors. The Byron Sher Auditorium is on the 2nd floor and may be accessed by using the elevator or stairs.

Evening Scoping Meeting

Date and Time:	Wednesday, November 5, 2014, 7:00 PM (PST)
Location:	Holiday Inn Express Hotel, 2810 Main St., Red Bluff, California.
Phone number:	Front Desk - (530) 528-1600

Copies of the SD1 outlining the subject areas to be addressed in the EA were distributed to the parties on the Commission's mailing list. Copies of the SD1 will be available at the scoping meeting or may be viewed on the web at http://www.ferc.gov using the "eLibrary" link (see item m above).

Environmental Site Review

The Applicant and FERC staff will conduct a project Environmental Site Review beginning at 8:00 AM (PST) on Thursday, November 6, 2014. All interested individuals, organizations, and agencies are invited to attend. All participants should meet at the Walmart Parking Lot, 1025 S. Main St., Red Bluff, California. All participants are responsible for their own transportation to the meeting site. Anyone with questions about the Environmental Site Review (or needing directions) should contact Charlie Kuffner of Rugraw, LLC at (415) 652-8553 or email at charlie.kuffner@gmail.com. Those individuals planning to participate in the Environmental Site Review should notify Mr. Kuffner of their intent, no later than Friday, October 31, 2014. For more details about the Environmental Site Review, including meeting locations, transportation options, meal options, and the itinerary, please see the information in Appendix A of the SD1.

Objectives

At the scoping meetings, the staff will: (1) summarize the environmental issues tentatively identified for analysis in the EA and CEQA document; (2) solicit from the meeting participants all available information, especially quantifiable data, on the resources at issue; (3) encourage statements from experts and the public on issues that should be analyzed in the EA, and CEQA document, including viewpoints in opposition

to, or in support of, the staffs' preliminary views; (4) determine the resource issues to be addressed in the EA and CEQA document; (5) identify those issues that require a detailed analysis, as well as those issues that do not require a detailed analysis; (6) solicit from the meeting participants, input to the State Water Board on the type of CEQA document that should be prepared, and 7) solicit from any responsible or trustee agency or other interested parties that believes an EIR should be prepared, environmental information to identify the scope and content of an EIR should the State Water Board determine an EIR should be prepared.

Procedures

The meetings will be recorded by a stenographer and become part of the formal record of the Commission and State Water Board proceedings on the project.

Individuals, organizations, and agencies with environmental expertise and concerns are encouraged to attend the meeting(s) and to assist the staff in defining and clarifying the issues to be addressed in the EA and CEQA document.

Kimberly D. Bose,
Secretary.

APPENDIX A-1

Joint Scoping Meeting Comments

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From: Chetelat, Guy@Waterboards
Sent: Friday, December 05, 2014 11:22 AM
To: Lobo, Michelle@Waterboards
Cc: Day, George@Waterboards
Subject: Lassen Lodge Hydroelectric Project

Michelle Lobo
State Water Resources Control Board

The following comments and questions pertain to the proposed Lassen Lodge Hydroelectric Project on the South Fork of Battle Creek.

1. Compliance with the Construction Storm Water General Permit is required for installation of the project.
2. Special care will be required regarding installation of concrete features in or adjacent to the creek.
3. Temporary diversion of the creek past active work areas will be needed. This must be performed in a manner that protects water quality and aquatic life.
4. How will the project impact water temperature in South Fork Battle Creek under reduced snow pack and more frequent drought conditions expected as a result of climate change?
5. Given the design of the project and supporting studies, a CEQA Mitigated Negative Declaration appears appropriate.

Please contact me if you need any clarification of these comments.

Guy

Guy Chetelat
Engineering Geologist, P.G.
Central Valley Regional Water Quality Control Board
364 Knollcrest Drive, Suite 205
Redding, Ca 96002

Tele: 530.224.4997
Fax: 530.224.4857

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NOAA FISHERIES SERVICE
WEST COAST REGION
650 Capitol Mall, Suite 5-100
Sacramento, California 95814-4706

December 4, 2014

In response, refer to:
WF/WCR/FERC P-12496-002

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, NE
Washington, D.C. 20426

Michelle Lobo
State Water Resources Control Board
Division of Water Rights, Water Quality Certification Program
P.O. Box 2000
Sacramento, CA 95812-2000

Re: NOAA Fisheries Service's Comments on Joint Scoping Document 1 for the Lassen Lodge Hydroelectric Project, Federal Energy Regulatory Commission Project No. 12496-002, South Fork Battle Creek, California.

Dear Secretary Bose and Ms. Lobo:

NOAA Fisheries Service (NMFS) submits in Enclosure A our comments on the Federal Energy Regulatory Commission's (FERC) and California State Water Resources Control Board's (SWRCB) Joint Scoping Document 1 (SD1) for Rugraw, LLC's (Applicant) Lassen Lodge Hydroelectric Project, FERC Project No. 12496-002 (Project). We also incorporate by reference our June 2014 Letter (NMFS 2014a), which detailed the unacceptable nature of the Applicant's Final License Application (FLA) due to the use of unacceptable methods.

Thank you for the opportunity to comment. We continue to be concerned as the flaws within the FLA have not been clarified nor addressed in the SD1. In addition, the SD1 did not consider the Project's effects on the various anadromous salmonid resources within South Fork Battle Creek, including those species federally listed and their critical habitats designated under the Endangered Species Act (ESA).

NMFS' staff reviewed the Joint SD1, and attended the Joint SD1 meetings and site visit. Based upon our participation and detailed document review, we arrived at 2 major conclusions for FERC and the SWRCB to consider:

(1) We believe the proposed Project represents a major action with significant impacts, requiring an Environmental Impact Statement/Report environmental document(s) for both the FERC and the SWRCB.

(2) We reiterate that the Project's operations would directly and cumulatively affect all anadromous salmonid resources within the Project's bypassed reach of the South Fork Battle Creek over the term of the new license.

NMFS notes that the 2 conclusions above are based upon the ESA-listed anadromous salmonids and ESA-designated critical habitats found downstream of Angel Falls in the South Fork Battle Creek (NMFS 2014a; 2014b). Finally, we also believe it reasonably certain that anadromous salmonids would reach the Project's bypassed reach over the terms of the new license.

Thank you for the opportunity to provide comments. If you have questions regarding these documents, please contact William E. Foster (916-930-3617) of my staff.

Sincerely,

Steve Edmondson
FERC Branch Supervisor
NMFS, West Coast Region

Enclosures

cc: FERC Service List for P-12496.

Enclosure A

UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Lassen Lodge, LLC	**)**	**Project No. P-12496-002**
Lassen Lodge Hydroelectric Project	**)**	
South Fork Battle Creek	**)**	

NOAA FISHERIES SERVICE'S COMMENTS
ON JOINT SCOPING DOCUMENT 1

1.0 Introduction

On October 3, 2014, the Federal Energy Regulatory Commission (FERC) issued Scoping Document 1 (SD1) as well as a Joint SD1 Notice, *Notice of Joint Scoping Meetings with the California State Water Resources Control Board* [SWRCB] *and Environmental Site Review and Soliciting Scoping Comments*" for Rugraw, LLC's (Applicant) Lassen Lodge Hydroelectric Project, FERC Project No. 12496-002 (Project), located on the South Fork Battle Creek, California. Thus, NOAA Fisheries Service (NMFS) submits our comments on SD1, below in Section 3.0, for consideration by the FERC and the SWRCB.

2.0 Status of Anadromous Fish

NMFS is a federal agency with jurisdiction over anadromous fish resources affected by the licensing, operation, and maintenance of hydroelectric projects. See Reorganization Plan No. 4 of 1970 (84 Stat. 2090), as amended; the Federal Power Act (FPA) (16 U.S.C. § 803(j) and 811); the Fish and Wildlife Coordination Act (FWCA) (16 U.S.C. § 661 and 662); the

Magnuson-Stevens Fishery Conservation and Management Act (MSA) (16 U.S.C. §1801 *et seq*.); and the Endangered Species Act (ESA) (16 U.S.C. §1531 *et seq.*).

We note that the anadromous fish listed below will be able to access the Project's bypass reach up to Angel Falls (River-Mile [RM] 22.3) once both the Coleman Diversion Dam (RM 2.5) and the South Diversion Dam (RM 14.3) of the Battle Creek Hydroelectric Project, FERC Project No. 1121, are removed from the South Fork Battle Creek. The Battle Creek Salmon and Steelhead Restoration Project (BCSSRP) has full funding and written plans to remove these last barriers to anadromous fish by 2019 (USBR 2014). This restoration action is reasonably certain to occur over the term of the new license for the P-12496 Project (USBR 2014). Thus, NMFS is concerned with the following ESA / MSA federally managed anadromous fish and resident *O. mykiss* resources that would access the South Fork Battle Creek up to Angel Falls and be affected by the Project, once the dams of the BCSSRP have been removed:

- Sacramento River Winter-run Chinook salmon ESU (*Oncorhynchus tshawytscha*), (Endangered) (59 FR 440, January 4, 1994);
- Central Valley (CV) spring-run Chinook salmon (*O. tshawytscha*) (Threatened/Critical Habitat) (64 FR 50394, September 16, 1999 / 70 FR 52488, September 2, 2005);
- California CV steelhead (*O. mykiss*) (CCV steelhead) (Threatened/Critical Habitat) (71 FR 834, January 5, 2006 / 70 FR 52488, September 2, 2005);
- CV Fall-run Chinook salmon (*O. tshawytscha*) (Species of Concern) (69 FR 19975, April 15, 2004);
- Pacific Chinook salmon, all ESUs (*O. tshawytscha*) (Essential Fish Habitat) (71 FR 61022, October 17, 2006) and
- Resident *O. mykiss* above man-made (RM 14.3) and natural (RM 22.3) barriers.

We note above that there is no critical habitat for Sacramento River winter-run Chinook salmon designated within the Project's bypassed reach in South Fork Battle Creek (it is designated in Battle Creek up to the Coleman Hatchery weir). In addition, studies have shown that isolated

populations of non-anadromous *O. mykiss* can revert to the anadromous form if given an opportunity - even after over 70 years of isolation (Docker and Heath 2003; Thrower *et al*. 2004). Thus, such isolated *O. mykiss* populations could serve as a source-stock for the eventual recovery of CCV steelhead within the Battle Creek watershed, pursuant to NMFS' Final Central Valley Recovery Plan for ESA-listed salmonids (NMFS 2104b). In addition, the resident and anadromous forms of *O. mykiss* co-evolved and both contribute to the diversity of life-history strategies which enhances the overall viability of the *O. mykiss* complex within the Battle Creek watershed.

3.0 Comments on SD1

3.1 General Comments

NMFS' staff have reviewed the Joint SD1, attended the Joint SD1 meetings and site visit, and we present two main points for FERC and the SWRCB to consider:

(1) We believe that an Environmental Impact Statement/Report would be the desired environmental document(s) for both the FERC and the SWRCB.

(2) We also believe that the Project's operations would directly and cumulatively affect all anadromous salmonid resources within the Project's bypassed reach of the South Fork Battle Creek over the term of the new license.

NMFS notes that the two points above are valid due to the ESA-listed anadromous salmonids and ESA-designated critical habitats found downstream of Angel Falls in the South Fork Battle Creek as noted in Section 2.0. We also believe it reasonably certain that anadromous salmonids would reach the Project's bypassed reach over the terms of the new license.

NMFS acknowledges that our comments on the SD1 are also due to FERC omissions as well as items that the Applicant proposed, but that we feel are incorrect. NMFS realizes that some of

FERC's responses in this SD1 are due to what the Applicant submitted. Regardless, our June 2014 comment letter on the Applicant's Final License Application (FLA) (NMFS 2014a) describes very detailed problems with the FLA and provides our rationale to support our statements. Our remaining comments also support our above main points and are noted below by SD1 page number, relevant Section and/or text.

3.2 Specific Comments

(1) *SD1, Page 4, 1st paragraph:*
"On April 21, 2014, Rugraw, LLC (Rugraw) filed an application for an original license [FLA]*..."* [FERC accepted the FLA on August 28, 2014].

NMFS' comments on the FLA found the FLA deficient, primarily due to use of the Hydraulic Geometry (HG) method to determining habitat vs. flow relationships (NMFS 2104a). The HG method, its specific application, and input data are flawed and wholly inadequate to support the proposals and analyses in the FLA. Consequently, this flawed approach and inadequate data render much of the FLA unsupported. More details are provided in NMFS (2014a).

(2) *SD1, Page 4, 3rd paragraph:*
"Although our current intent is to prepare a draft and final environmental assessment (EA), there is a possibility that an Environmental Impact Statement (EIS) will be required."

Currently, we believe that ESA-listed anadromous salmonids would reach the Project's bypass reach, up to the limit of anadromy at Angel Falls, within the term of the proposed new license. This is based on the Final Rule that designated ESA critical habitat for CV spring-run and CCV steelhead up to Angel Falls. In addition, Essential Fish Habitat (EFH) also exists for all Pacific Chinook salmon per the MSA. The potentially significant impacts to ESA-listed species/habitats and commercially important, EFH requires an EIS/EIR. This SD1 does not

discuss any ESA-listed anadromous salmonids. We discussed this issue in our comments on the FLA (NMFS 2014a).

(3) *SD1, Page 9, 1st paragraph:*
"If we receive no substantive comments on SD1..."

The SD1 does not discuss ESA-listed anadromous salmonids. The SD2 and EIS/EIR will need to address ESA listed salmonids. Although FERC commented at the SD1 meetings that they left out salmonids and that salmonids may be cumulatively affected by the Project, we disagree with this viewpoint. The Project would directly and cumulatively affect ESA-listed salmonids as the Project's operations would affect critical habitat as well. We discussed this issue in our comments on the FLA (NMFS 2014a).

(4) *SD1, Page 10, 6th paragraph:*
"Rugraw proposes to release a minimum flow of 13 cfs to the bypass reach."
"Stream flows greater than the combined turbine capacity and minimum flow would proceed unimpeded by the project through the bypass reach."

NMFS contests the 13 cubic-feet-per-second (cfs) minimum instream flow (MIF) proposed by the Applicant, as it was derived using the flawed HG Method and is also too low to allow fish passage within the anadromous bypassed reach. In addition, there is no discussion of the Applicant's "intent" expressed in the FLA to "not operate if flows go below proposed 18 cfs or in the summer." NMFS' letter (2014a) discussed our concerns with the inadequately low MIF and described how the Project is capable of operating just before and just after the "summer" period. Project operations during these periods would directly affect EFH as well as affect the ESA-listed salmonids and alter their critical habitat.

(5) *SD1, Page 11, Water Quality Resources:*

We note that FERC recently ordered the Applicant to develop a water temperature model and a sediment transport model to provide more information to the FLA. This modeling will need to be included in the environmental analysis document. We discussed this issue and the need for such modeling, in our comments on the FLA (NMFS 2014a).

(6) *SD1, Page 11, Water Quality Resources, Bullet 5:*
"...3) within the bypass reach above the tailrace, 4) within the bypass reach below the tailrace..."

These locations for water temperature monitoring were taken from the Applicant's FLA and we do not agree. A location is needed between Angel Falls and the tailrace. Point #4 should read as, *"...Just below the tailrace"* (because "below the tailrace" means that it is no longer in the bypass reach). We discussed this issue in our comments on the FLA (NMFS 2014a).

(7) *SD1, Page 12, Fisheries Resources, Bullet #5:*
"...three flow monitoring stations..."

We believe that an additional flow monitoring station should be located just above the Project's diversion structure.

(8) SD1, Page 12, *Fisheries Resources, last Bullet:*
"Monitor the tailrace during project operations for the presence of anadromous fish whenever the facility is visited by staff. Consult with Cal Fish and Wildlife and National Marine Fisheries Service, if anadromous fish are found to occur repetitively, to provide modifications of the tailrace structure to discourage fish attraction."

We believe that monitoring the tailrace entry point is important for both future anadromous and current resident fish populations. Monitoring should not be "done whenever staff visit" but should be continuous when Project is operating during likely fish migration periods. Perhaps this could be done via a remote camera system. In addition, salmonids may be affected by the

tailrace flow and its variability, which could cause fish to become stranded and/or induce migration delays due to the false attraction signature from the tailrace discharge. This needs to be analyzed in the EIS/EIR. See NMFS' comment #12 also.

(9) *SD1, Page 15, Threatened and Endangered Species:*

We note that the SD1 omits any mention of ESA-listed salmonids. This is a major flaw and a SD2 and an EIR/EIS will need address ESA-listed salmonids. Over the term of the license, it is reasonably foreseeable that ESA-listed salmonids (CV spring-run Chinook salmon and CCV steelhead) would access the Project's bypass reach up to Angel Falls. There is critical habitat designated for the above ESA-listed salmonids by Final Rule downstream of Angel Falls. EFH also exists for Pacific Chinook salmon up to Angel Falls, per MSA, and this is not discussed in SD1 either. We discussed these issues in our comments on the FLA (NMFS 2014a).

(10) *SD1, Page 16, Section 4.1.1 Resources That Could Be Cumulatively Affected:*
"...aquatic (specifically migratory fish)."

This is a very vague statement. As noted above in the "Threatened and Endangered Species" Section, ESA-listed salmonids have not been included and they are anadromous and "migratory fish." These resources include salmonids downstream of the powerhouse and would be directly and cumulatively affected. We discussed this issue in our comments on the FLA (NMFS 2014a).

(11) *SD1, Page 17, Section 4.1.2 Geographic Scope:*
"...(2) the project influences the ability of salmon and steelhead to utilize historical habitat within the project area."

We believe this to be too general a statement, as ESA-listed salmonids are not specifically noted in this SD1. However, the ESA-listed and non-listed salmonids will have access to the Project's bypassed reach up to Angel Falls due to the "reasonably certain" nature of future South

Fork Battle Creek Restoration actions (USBR 2014). We discussed this issue in our comments on the FLA (NMFS 2014a).

(12) *SD1, Page 18, Section 4.2.2 Aquatic Resources:*

[a] *"...Effects of project construction activities (e.g., in-water work and excavation)* ***on fisheries and aquatic habitat downstream*** *of the project construction site."*

[b] *"Effects of project operation* ***on water quality*** *in the South Fork Battle Creek."*

[c] *"Effects of project operation,* ***including ramping during startup and shutdown and minimum flow releases, on fisheries and aquatic resources*** *in the South Fork Battle Creek.*

[d] *"Effects of project operation and facilities* ***on upstream and downstream fish passage, including entrainment and turbine mortality****."*

We believe that for Points [a] to [d] above, the "Effects on Aquatic Resources" section should include a discussion of ESA-listed anadromous salmonids, resident salmonids, and their habitats (including both ESA-critical habitats and MSA-EFH).

Additionally, Point [b] above should be expanded to include how the "Project's Operations" would affect sediment transport and sedimentation and water temperatures as part of "Effects to Water Quality."

Furthermore, Points [c] and [d] above should include an analysis or study of how salmonids may be affected by the tailrace flow and its variability, which could cause fish to become stranded and/or induce migration delays due to the false attraction signature from the tailrace discharge (see also NMFS' comment # 8 regarding the tailrace flow). Point [d] above also needs more discussion regarding the Project's effects on fish passage for all anadromous salmonids into and within the bypass reach. The Applicant's own FLA noted that some areas within the

bypass reach, above and below Angel Falls, may require instream flows up to 60 cfs in order for any salmonids to traverse the bypass reach unimpeaded.

Finally, regarding Point [d] above, the entrainment of resident *O. mykiss* should also be considered as well. The resident and anadromous forms of *O. mykiss* co-evolved and both contribute to the diversity of life-history strategies available to the *O. mykiss* complex within the Battle Creek watershed. *O. mykiss* populations upstream of the Project could serve as a source-stock for the eventual recovery of CCV steelhead (NMFS 2014b). We discussed these issues in our comments on the FLA (NMFS 2014a).

(13) *SD1, Page 19, Section 4.2.4 Threatened and Endangered Species:*

Same comments as our #8 (SD1, page 15): ESA-listed anadromous salmonids have not been included and should be. We discussed this issue in our comments on the FLA (NMFS 2014a).

(14) *SD1, Page 21, Section 6.0, EA Preparation Schedule:*

We believe that FERC did not consider the extra time required as a result of FERC's request for developing water temperature and sediment transport modeling study plans (pursuant to FERC's Study Plan Criteria). To date, these modeling study plans do not appear to comply with FERC's Study Plan Criteria. Such study plans are due to FERC by December 5, 2014. Additional time after that date will be needed for the development of such models based on FERC-accepted study plans. Finally, more time will be needed to make modeling runs and interpret the data generated. Thus, FERC's projection of an "REA Notice in January 2015" is not reasonable and that date would need to be pushed out at least to March 2015.

(15) *SD1, Page 24, Section 8.0 Comprehensive Plans*:

We note that on October 6, 2014, we filed our "*Final Recovery Plan for the Evolutionarily Significant Units of Sacramento River Winter-run Chinook Salmon and Central Valley Spring-run Chinook Salmon and the Distinct Population Segment of Central Valley Steelhead (issued July 22, 2014)*" (NMFS 2104b) under Docket ZZ09-5-000 for consideration as a FERC Comprehensive Plan under Section 10(a)(2)(A) of the Federal Power Act. We also provided rationale for why our Recovery Plan exceeds FERC's criteria for a Comprehensive Plan.

(16) *SD1, Page 30, Section 9.0 Mailing List* [and Service List]:

NMFS would like the following staff addresses and e-mails to be updated on the FERC Service List for the Project/P-12496-002:

Kathryn L Kempton, Attorney-Advisor
NOAA Office of General Counsel – West Coast Region
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4.0 References

Docker, M.F. and D.D. Heath. 2003. Genetic Comparison between Sympatric Anadromous Steelhead and Freshwater Resident Rainbow Trout in British Columbia, Canada. *Conservation Genetics* 4: 227–231, 2003. *Kluwer Academic Publishers.*

NOAA Fisheries Service (NMFS). 2014a. Letter from Steve Edmondson (NMFS) to Secretary Bose (FERC), Re: "*NOAA Fisheries Service's Comments on the Final License Application for the Lassen Lodge Hydroelectric Project, Federal Energy Regulatory Commission Project No. 12496, South Fork Battle Creek, California*." NMFS, West Coast Region, Sacramento, California. June 12, 2014.

NMFS. 2014b. *Final Recovery Plan for the Evolutionarily Significant Units of Sacramento River Winter-run Chinook Salmon and Central Valley Spring-run Chinook Salmon and the Distinct Population Segment of Central Valley Steelhead.* NMFS, West Coast Region, Sacramento, California. July 22, 2014.
Available at: http://swr.nmfs.noaa.gov/recovery/centralvalleyplan.htm.

Thrower, F.P., *et al*. 2004. Genetic Architecture of Growth and Early Life-History Transitions in Anadromous and Derived Freshwater Populations of Steelhead. *Journal of Fish Biology (2004) 65 (Supplement A), 286–307*. Available online at http://www.blackwell-synergy.com.

U.S. Bureau of Reclamation (USBR). 2014. USBR's website: The Battle Creek Salmon and Steelhead Restoration Project (BCSSRP).
http://www.usbr.gov/mp/battlecreek/index.html.

Federal Register Notices (FR)

FR. 1993. 58 FR 33212, June 16, 1993. Designated Critical Habitat for Sacramento River winter-run Chinook salmon Evolutionarily Significant Unit. Final Rule.

FR. 1994. 59 FR 440, January 4, 1994. Endangered and Threatened Species; Status of Sacramento River winter-run Chinook salmon (as Endangered). Final Rule.

FR. 2005. 70 FR 52488, September 2, 2005. Endangered and Threatened Species: Designation of Critical Habitat for Seven Evolutionarily Significant Units of Pacific Salmon and Steelhead in California. Final Rule.

FR. 2006. 71 FR 834, January 5, 2006. Endangered and Threatened Species: Final Listing Determinations for 10 Distinct Population Segments of West Coast Steelhead. Final Rule.

Enclosure B

UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Lassen Lodge, LLC	**)**	**Project No. P-12496-002**
Lassen Lodge Hydroelectric Project	**)**	
South Fork Battle Creek	**)**	

CERTIFICATE OF SERVICE

I hereby certify that I have this day served, by first class mail or electronic mail, a letter to Secretary Bose, Federal Energy Regulatory Commission and to Ms. Lobo, California State Water Resources Control Board, containing the NOAA Fisheries Service's comments on the Joint Scoping Document 1 for the Lassen Lodge Hydroelectric Project (P-12496-002). This Certificate of Service is served upon each person designated on the official Service List compiled by the Commission in the above-captioned proceeding.

Dated this 4th day of December 2014

William E. Foster
National Marine Fisheries Service

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

Rugraw, LLC	**)**	**Project No. 12496**
	)	**(Lassen Lodge Hydroelectric Project)**

PACIFIC GAS AND ELECTRIC COMPANY'S COMMENTS ON JOINT SCOPING DOCUMENT 1

Pursuant to the Commission's October 3, 2014 Notice Of Joint Scoping Meetings And Environmental Site Review And Soliciting Scoping Comments ("Scoping Notice"), Pacific Gas and Electric Company ("PG&E") hereby submits its comments on Commission Staff's Scoping Document 1 ("SD1") for the Commission's National Environmental Policy Act ("NEPA") review of Rugraw, LLC's ("Rugraw") April 21, 2014 application for license for the Lassen Lodge Hydroelectric Project No. 12496 ("LL Project").

INTRODUCTION

PG&E appreciates the opportunity to comment on SD1. PG&E is a strong advocate for hydroelectric generation and thus supports the responsible development of new hydroelectric projects. However, PG&E has concerns with respect to the potential impact of the LL Project on PG&E's licensed Battle Creek Hydroelectric Project No. 1121 ("Battle Creek Project"), which is located on the mainstem Battle Creek and the North and South Forks of Battle Creek and which includes three diversion structures on the South Fork Battle Creek downstream of the proposed location of the LL Project: the Coleman Diversion Dam, the Inskip Diversion Dam, and the South Diversion Dam. *See* 56 FPC 994 (1976).

PG&E's detailed concerns with respect to the potential impact of the LL Project on the Battle Creek Project are set forth below. PG&E respectfully requests that the Commission

consider these comments when preparing its NEPA document on, and issuing the license for, the LL Project.

BACKGROUND

As discussed in SD1, the LL Project would be located on the South Fork Battle Creek. It would include a diversion dam at River Mile 23, an intake, a 7,258-foot-long pipeline feeding a 5,230-foot-long penstock, a 50 by 50-foot powerhouse containing a single turbine/generating unit with a capacity of 5.0 megawatts and an integral tailrace, and a concrete box culvert from which Project discharges would return to the South Fork Battle Creek. The LL Project's bypass reach would be approximately 2.4 miles-long. The LL Project would be operated as a run-of-river project. Rugraw proposes to provide a minimum flow of 13 cubic-feet-per-second ("cfs") to the bypass reach, with all flow greater than 13 cfs diverted by the LL Project's intake up to the maximum capacity of the turbine (95 cfs). Rugraw also proposes to follow a 30% of existing stream flow per hour ramping rate. *See* SD1 at p. 12.

As to PG&E's Battle Creek Project, PG&E is participating in a cooperative endeavor with state and federal agencies and non-governmental groups pursuant to a 1999 Memorandum Of Understanding ("MOU") to restore self-sustaining populations of Chinook salmon and steelhead and their habitat in the Battle Creek watershed (the Battle Creek Steelhead and Salmon Restoration Project ("Restoration Project")). The Restoration Project has been divided into three separate phases: Phase 1A; Phase 1B; and Phase 2. The Commission has already approved Phase 1A (*see Pacific Gas and Electric Co.*, 128 FERC ¶ 62,135 (2009)) and Phase 1B (*see Pacific Gas and Electric Co*, 131 FERC ¶ 62,166 (2010). PG&E is currently in the process of preparing the license amendment application to implement Phase 2. The Restoration Project includes, *inter alia*, modifications to nine dam sites at the Battle Creek

Project, including installation of fish passage facilities and removal of facilities, increases in minimum flows, and the rerouting of flows. Under the MOU, the Restoration Project, and the license for the Battle Creek Project, PG&E is required to maintain specified minimum instream flows past all three diversion structures and to comply with a strict ramping rate requirement of 0.1 ft/hr.[1]

COMMENTS

PG&E has three major concerns with the LL Project.

PG&E's initial concern is that operation of the LL Project could adversely affect the ability of PG&E to comply with the 0.1 ft/hr ramping rate requirement at its downstream Coleman, Inskip, and South Diversion Dams on the South Fork Battle Creek. Specifically, if Rugraw follows the 30% of flow per hour ramping rate during project shutdowns and startups as it proposes, PG&E may be unable to comply with the mandated 0.1ft/hr ramping rate requirement at its downstream facilities. More specifically, if Rugraw ramps 30% of total stream volume per hour, the stream depth at the Inskip Diversion Dam (and other diversions) may drop faster than PG&E's requirement in its license to not ramp more than 0.1 ft of stream depth per hour. PG&E is required to ramp based not on a percentage of total stream volume, but rather, on the rate of water surface elevation drop. This method of ramping regulation is designed to prevent stranding of endangered salmonids.

A second concern is whether Rugraw's proposed ramping rate of 30% of total stream flow per hour may impede PG&E's ability to comply with the instream flow requirements of the Battle Creek Project license. For example, if 105 cfs is in the South Fork Battle Creek

[1] The minimum instream flow requirements are specified in Article 33(a) of the Battle Creek Project license, while the ramping rate provision is set forth in Article 33(d). *See* 128 FERC ¶ 62,135 at pp. 64,336-338.

during March, and Rugraw ramps 30 cfs in one hour during an unplanned outage, there would be insufficient water at PG&E's South, Inskip, and Coleman Diversion Dams to meet the instream flow requirements mandated for those facilities, possibly causing PG&E to violate its license. This is because PG&E's automated gate controls cannot respond to a sudden 30 cfs gap in flow. Thus, a slower ramping rate at the LL Project is needed to ensure that sufficient stream flow volumes are available for use by PG&E downstream.

A final concern is whether Rugraw's proposed ramp rate gives sufficient time of travel so ramped water has time to pass its outlet before ramping again. If the natural streambed time of travel from the top of the LL Project's diversion is faster than the time of travel through its 2.4-mile-long conveyance structures (pipeline/penstock), this will not be an issue. However, if the water travels faster through the conveyance structures than the creek, PG&E will be at risk of non-compliance with its instream flow requirements at its downstream Diversion Dams. A slower ramping rate for the LL Project would mitigate for this potential adverse impact.

PG&E requests that the Commission specifically consider the above-discussed operational issues in its NEPA document on the LL Project. PG&E recommends that the Commission also evaluate the possibility of changing Rugraw's proposed volume-based ramp rate from 30% of total stream volume per hour to a requirement similar to that set forth in Article 33(d) of PG&E's Battle Creek Project License (*i.e.*, a requirement that PG&E target a ramping rate of 0.1 ft/hour when returning facilities back to service after outages). PG&E notes in this regard that Rugraw's proposed ramping rate would allow the equivalent of 100% of stream volume less 5 cfs to be diverted in three hours, while an equivalent ramping scenario at an adjacent PG&E site may take over 24 hours. Finally, PG&E recommends that such a revised ramping rate provision be included in the license for the LL Project. PG&E believes such a

change should be made to support endangered species management efforts as reflected in the MOU and the Restoration Project and to ensure that PG&E can meet its instream flow and ramping rate requirements at its Battle Creek Project license.

CONCLUSION

PG&E respectfully requests that the Commission consider the comments of PG&E set forth herein in preparing its NEPA document on, and issuing the license for, the LL Project.

Respectfully submitted,

/s/ John A. Whittaker, IV

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ATTORNEYS FOR PACIFIC GAS AND ELECTRIC COMPANY

Dated: December 5, 2014

CERTIFICATE OF SERVICE

I hereby certify that I have this day served the foregoing document on the parties designated on the official service list compiled by the Secretary in this proceeding.

Dated at Washington, D.C., this 5th day of December, 2014.

/s/ John A. Whittaker, IV
John A. Whittaker, IV

PLANNING DEPARTMENT
COUNTY OF TEHAMA

Courthouse Annex, Room "I"
444 Oak Street
Red Bluff, California 96080
530-527-2200 Telephone
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Email: Planning@co.tehama.ca.us

Sean M. Moore, AICP
Director of Planning

December 4, 2014

STATE WATER RESOURCES CONTROL BOARD
Division of Water Rights
P.O. Box 2000
Sacramento, CA 95812-2000
ATTN: Michelle Lobo

RE: LASSEN LODGE HYDROELECTRIC PROJECT NO. 12496-000

Dear Michelle Lobo:

Tehama County has reviewed the 1,800 plus page FERC application, Environmental Report and the attached appendices for a license to establish and operate a 5 megawatt (MW) hydropower facility sited on the upper South Fork Battle Creek, approximately 1.5 miles west of the town of Mineral, an unincorporated community in Tehama County, California.

The Project is located primarily on the south bank of South Fork Battle Creek between elevations of 3,417 feet and 4,310 feet above mean sea level. Power generated from the Project will be transmitted by a new, approximately 12-mile-long, 60 kV transmission line ranging in elevation from 3,470 feet at the generation substation climbing up to a maximum elevation of 4,422 feet then down to the low point of the transmission line at an elevation of approximately 2,105 feet, where it interconnects with the Pacific Gas and Electric (PG&E) Volta – South Transmission line in the town of Manton, California.

The Environmental Report has identified significant impacts associated with both the construction and operational aspects of the Project. Specifically lacking in the Environmental Report is a grading plan identifying the cut/fill points of all components of the Project. Grading will be required for the development of the intake/outlet areas, pipeline, roadways and transmission lines. Without an accurate and fully dimensioned grading plan, BMPs for individual Project segments are not identifiable and an environmental assessment of the grading would at best be subjective. In a letter dated

August 22, 2012, to complete the application, the Planning Department required the submittal of "Larger scale maps for power line alignment and area of pen stock alignment including grading plans per Public Works requirements pursuant to Chapter 9.43 of the Tehama County Code pertaining to grading and erosion control." The grading plan has not been submitted to the County per our request.

Other Significant Impacts

- Project may significantly impact the County's existing recreational opportunities contrary to the Tehama County General Plan Economic Development Element.
- Project may significantly impact areas identified as critical riparian zones contrary to the Tehama County General Plan Open Space and Conservation Element.
- Project may significantly impact the ability to protect fish populations and ensure adequate flow levels for spawning activity contrary to policies and implementation measures of the Tehama County General Plan Open Space and Conservation Element.
- Project may significantly impact fisheries, specifically trout and protected salmon.
- Project may significantly contribute to the aesthetic degradation of the Project site.

The information provided as part of the FERC application provides substantial evidence that the Project will result in significant impacts and necessitate the preparation of an Environment Impact Report (EIR). Therefore, the County of Tehama is requesting that the State Water Resources Control Board prepare an EIR.

Respectfully,

S Moore

Sean M. Moore, AICP
Director of Planning
Tehama County, CA

APPENDIX A-2

State Water Board NOP Comments

Joint Scoping Meeting Comments

Lobo, Michelle@Waterboards

From: Charlie Kuffner <charlie.kuffner@gmail.com>
Sent: Wednesday, February 18, 2015 1:40 PM
To: Bob Cords
Cc: pbarnws@waterboards.ca.gov; Sean Moore; dgarton@tehamacountyadmin.org; Tompkins Jim; Lobo, Michelle@Waterboards; Monheit, Susan@Waterboards; Drescher, Brionna@Waterboards
Subject: Re: LLHP (FERC 12496)

Bob:

Thank you for your email of 2/13/'15 regarding the proposed Lassen Lodge Hydroelectric Project.

In response to the question that you posed regarding new transmission line maintenance, we offer the following:

The "Gen-tie" transmission line the project is proposing to build, including the step-up transformer sub-station near the generation site and the Point of Interconnection (POI) switchyard in the project ROW just east of South Powerhouse Road, will be owned and maintained by Rugraw, LLC, the project developer.

PG&E will own and maintain the project Point of Interconnection onto the existing Volta South transmission line on South Powerhouse Road.

We appreciate you continued interest in the project. Please let us know if you have any further questions of comments on the project that we can address.

Tx,

Charlie Kuffner
415-652-8553
charlie.kuffner@gmail.com
SKYPE: charlie.kuffner

On Fri, Feb 13, 2015 at 9:16 AM, Bob Cords <bobcords@frontiernet.net> wrote:
Although unable to attend the community meeting held in Manton on Monday, Feb. 9, I reviewed some excellent notes taken by Ms. Janet Rogers and have done some limited research on the fire hazard issue.

Although I am the Assistant Chief for the Manton Volunteer Fire Department, and an engineer with 40+ years of experience, I make these comments as a private citizen and resident of Manton.

Provided that there is not significant environmental concerns raised by the EIR, I am inclined to support this project as i believe that hydro power on this scale is one of the most environmentally benign power sources available. The visual and auditory impact of this project seems inconsequential, the footprint small, and the benefit is worthwhile.

Fire Issues:

I don't know if there has been a specific study that identifies vegetation fires originating from lightning fire striking utility infrastructure vs. other objects. I did however find some information related to this subject.

According to the NFPA, (NFPA Report "Lightning Fires and Lightning Strikes", 2013, Marty Aherns), there were 10 fires caused by lightning striking utility structures from 2007-2011. This was out of a total of 1630 fires started from all lightning strikes in the report period, (00.6%).

Other data in this report seems to suggest that it is not very common for lightning striking utility structures to start a fire at all. In 2003 there were 3920 non-home lightning strikes that included 120 utility strikes that did not cause a fire. This further demonstrates that even if a utility structure is struck, it is not likely to initiate a fire. Utility systems by design are made to withstand and safely dissipate lightning strikes.

Although this data is derived only from reports from local and municipal fire departments, (does not include State or Federal fire agencies), it does suggest that wild land fires caused by lightning striking utility structures is exceedingly rare.

The data would suggest that the number of wild land fires caused by lightning striking utility structures is statistically insignificant relative to fires caused by lightning striking natural features, particularly trees.

In actuality, trees are much more "attractive" to lightning than power lines for several reasons. First, they are much better grounded, in that they have a massive rood structure penetrating deep into moist soil. Second, their structure is inherently more conductive that a power pole because of the natural moisture of the tree. The "Ponderosa Fire", although started by lightning, did not involve any power lines or poles, but was the result of a down strike in dry brush.

Regarding the fuel break, the developers have offered to rehabilitate that portion of the "Hazen Road shaded Fuel Break" that lies along the proposed right of way. It was not proposed as a complete fuel break project, but as an "assist" to existing or proposed projects. The Manton Fire Safe Council has been working with the Tehama County Resource Conservation District to develop a plan to rehabilitate this fuel break, so this would dovetail quite well with this goal. My only question in this regard is that once the transmission line is completed, will maintenance of the line and RoW be the responsibility of PG&E or the LLHP partners.

Manton Valley AVA

I can not conceive of any aspect of this effecting the Manton Valley AVA.

Thanks for your consideration of my comments

Bob Cords
Manton, CA
(530)474-4014

State of California – Natural Resources Agency
DEPARTMENT OF FISH AND WILDLIFE
Region 1 – Northern
601 Locust Street
Redding, CA 96001
www.wildlife.ca.gov

EDMUND G. BROWN JR., Governor
CHARLTON H. BONHAM, Director

March 9, 2015

Ms. Michelle Lobo
State Water Resources Control Board
Division of Water Rights
P.O. Box 2000
Sacramento, CA 95812-2000

Subject: Notice of Preparation for the draft Environmental Impact Report for the Lassen Lodge Hydroelectric Project, Federal Energy Regulatory Commission (FERC) Project NO. 12496, Near the Communities of Manton and Mineral, Tehama County

Dear Ms. Lobo:

The California Department of Fish and Wildlife (Department) has reviewed the above-referenced Notice of Preparation (NOP) for the Draft Environmental Impact Report (DEIR) for the Lassen Lodge Hydroelectric Project, State Clearinghouse Number 2015022043 (Project). The Project is located between the towns of Manton and Mineral along South Fork Battle Creek in Tehama County. The Department offers the following comments and recommendations on the Project in our role as the State's trustee for fish and wildlife resources, and as a responsible agency under the California Environmental Quality Act (CEQA), California Public Resources Codes §21000 *et seq*.

Project Description

The Project as stated in the Related Documents referenced in the NOP is:

> *"…to construct the Lassen Lodge Hydroelectric Project (Project) on the upper South Fork of Battle Creek, in Tehama County. The proposed Project will be located on the western slopes of the Cascade Range approximately 1.5 miles west of the town of Mineral, an unincorporated community in Tehama County. The proposed Project will be a run-of-the-river facility that will have a generating capacity of five megawatts. The sole purpose of the Project is hydropower generation.*
>
> *Most proposed Project elements will be located on the south side of the South Fork of Battle Creek. Facilities include: a diversion dam, intake structure, flow control/fish screen structure, pipeline and penstock, transition structure, powerhouse, substation, station service line, transmission line, switchyard, and multipurpose areas.*

Historically, stream flow in the proposed Project area was diverted into a ditch for lumber conveyance using the natural gradient. It is anticipated that the flow control/fish screen structure will use a segment of the historic ditch.

The Project proposes to take stream water through a penstock located approximately 0.7 miles above Angel Falls, run it through a Pelton wheel turbine and then return the water to the river 2.4 miles downstream above Panther Grade. For reference, Panther Grade is 1.7 miles upstream of the Battle Creek Salmon and Steelhead Restoration Project site."

Project Comments and Recommendations

The Department has met numerous times over the last five years to discuss the potential impacts this Project will have on the environment. The Department appreciates the opportunity to comment on the Project, relative to impacts to biological resources.

The Department is a trustee and responsible agency for the Project. To enable Department staff to adequately review and comment on the proposed Project, we recommend the following information be included in the DEIR, as applicable:

1. A complete assessment of the flora and fauna within and adjacent to the Project area should be conducted, with particular emphasis upon identifying special status species including rare, threatened, and endangered species. This assessment should also address locally unique species, rare natural communities, and wetlands. The assessment area for the Project should be large enough to encompass areas potentially subject to both direct and indirect Project effects. Both the Project footprint and the assessment area (if different) should be clearly defined and mapped in the DEIR.

    a. The Department's California Natural Diversity Data Base (CNDDB) should be searched to obtain current information on previously reported sensitive species and habitat, including Significant Natural Areas identified under Chapter 12 of the Fish and Game Code. In order to provide an adequate assessment of special-status species potentially occurring within the Project vicinity, the search area for CNDDB occurrences should include all U.S. Geological Survey 7.5-minute topographic quadrangles with Project activities, and all adjoining 7.5-minute topographic quadrangles. The DEIR should discuss how and when the CNDDB search was conducted, including the names of each quadrangle queried, or why any areas may have been intentionally excluded from the CNDDB query. Other electronic data bases such as the California Native Plant Society and the U.S. Fish and Wildlife Service should also be consulted.

b. A complete assessment of rare, threatened, and endangered invertebrate, fish, wildlife, reptile, and amphibian species should be presented in the DEIR. Rare, threatened, and endangered species to be addressed shall include all those which meet the CEQA definition (see CEQA Guidelines, § 15380). Seasonal variations in use of the Project area should also be addressed. Focused species-specific surveys, conducted at the appropriate time of year and time of day when the species are active or otherwise identifiable, are required. Acceptable species-specific survey procedures should be developed in consultation with the Department and the U.S. Fish and Wildlife Service. Links to some survey procedures are provided on the Department's website.[1]

c. Species of Special Concern (SSC) status applies to animals generally not listed under the federal Endangered Species Act or the California Endangered Species Act (CESA), but which nonetheless are declining at a rate that could result in listing, or historically occurred in low numbers and known threats to their persistence currently exist. SSC's should be considered during the environmental review process; specifically, foothill yellow-legged frog *(Rana boylii),* Cascades frog *(Rana cascadae)* and any impacts associated with Project operations (see 2. Below).

d. Fully Protected (FP) animals may not be taken or possessed at any time and the Department is not authorized to issue permits or licenses for their incidental take[2]. FP animals should be considered during the environmental review process and all Project-related take must be avoided.

e. A thorough assessment of rare plants and rare natural communities should be conducted, following the Department's November 2009 *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities* (Attachment 1).

f. A detailed vegetation map should be prepared, preferably overlaid on an aerial photograph. The map should be of sufficient resolution to depict the locations of the Project site's major vegetation communities, and show Project impacts relative to each community type. The vegetation classification

[1] http://www.dfg.ca.gov/wildlife/nongame/survey_monitor.html

[2] Scientific research, take authorized under an approved NCCP, and certain recovery actions may be allowed under some circumstances; contact the Department for more information.

system used to name the polygons should be described. Special Status natural communities should be specifically noted on the map.

g. The DEIR should include survey methods, dates, and results, and should list all plant and animal species detected within the Project study area. Special emphasis should be directed toward describing the status of rare, threatened, and endangered species in all areas potentially affected by the Project. All necessary biological surveys should be conducted in advance of DEIR circulation, and should not be deferred until after Project approval.

2. A thorough discussion of direct, indirect, and cumulative impacts expected to adversely affect biological resources, with specific measures to offset such impacts, should be included.

a. The DEIR should present clear thresholds of significance to be used by the Lead Agency in its determination of environmental effects. A threshold of significance is an identifiable quantitative, qualitative or performance level of a particular environmental effect.

b. CEQA Guidelines, § 15125, direct that knowledge of environmental conditions at both the local and regional levels is critical to an assessment of environmental impacts and that special emphasis shall be placed on resources that are rare or unique to the region.

c. Impacts associated with initial Project implementation as well as long-term operation and maintenance of the Project should be addressed in the DEIR pursuant to CEQA Guidelines 15126.2 (a).

d. In evaluating the significance of the environmental effect of the Project, the Lead Agency should consider direct physical changes in the environment which may be caused by the Project and reasonably foreseeable indirect physical changes in the environment which may be caused by the Project. Expected impacts should be quantified (e.g., acres, linear feet, number of individuals taken, volume or rate of water extracted, etc. to the extent feasible).

e. Project impacts should be analyzed relative to their effects on off-site habitats and species. Specifically, this may include public lands, open space, downstream aquatic habitats, areas of

groundwater depletion, or any other natural habitat or species that could be affected by the Project.

f. Impacts to and maintenance of wildlife corridor/movement areas and other key seasonal use areas should be fully evaluated and provided.

g. A discussion of impacts associated with increased lighting, noise, human activity, impacts of free-roaming domestic animals including dogs and cats, changes in drainage patterns, changes in water volume, velocity, quantity, and quality, soil erosion, and/or sedimentation in streams and water courses on or near the Project site.

h. Special considerations applicable to linear projects include ground disturbance that may facilitate infestations by exotic and invasive species over a great distance.

i. A cumulative effects analysis shall be developed for species and habitats potentially affected by the Project. This analysis shall be conducted as described under CEQA Guidelines, § 15130. General and specific plans, as well as past, present, and anticipated future projects, should be analyzed relative to their impacts to species and habitats.

3. A range of Project alternatives should be analyzed to ensure that the full spectrum of alternatives to the proposed Project are fully considered and evaluated. Alternatives which avoid or otherwise minimize impacts to sensitive biological resources shall be identified.

   a. If the Project will result in any impacts described under the Mandatory Findings of Significance (CEQA Guidelines, § 15065) the impacts must be analyzed in depth in the DEIR, and the Lead Agency is required to make detailed findings on the feasibility of alternatives or mitigation measures to substantially lessen or avoid the significant effects on the environment. When mitigation measures or Project changes are found to be feasible, such measures should be incorporated into the Project to lessen or avoid significant effects.

4. Mitigation measures for adverse Project-related impacts to sensitive plants, animals, and habitats should be developed and thoroughly discussed. Mitigation measures should first emphasize avoidance and reduction of Project impacts. For unavoidable impacts, the feasibility of on-site habitat restoration or enhancement should be discussed. If on-site mitigation is not feasible, off-site mitigation through habitat

creation, enhancement, acquisition and preservation in perpetuity should be addressed.

a. The Department generally does not support the use of relocation, salvage, and/or transplantation as mitigation for most impacts to rare, threatened, or endangered species. Studies have shown that these efforts are experimental in nature and largely unsuccessful. If considered, these types of mitigation measures must be discussed with the Department prior to release of the DEIR.

b. Areas reserved as mitigation for Project impacts shall be legally protected from future direct and indirect development impacts. Potential issues to be considered include public access, conservation easements, species monitoring and management programs, water pollution, and fire management.

c. Plans for restoration and revegetation should be prepared by persons with expertise in northern California ecosystems and native plant revegetation techniques. Each plan should include, at a minimum: (a) the location of the mitigation site; (b) the plant species to be used, container sizes, and/or seeding rates; (c) a schematic depicting the mitigation area; (d) planting/seeding schedule; (e) a description of the irrigation methodology; (f) measures to control exotic vegetation; (g) specific success criteria; (h) a detailed monitoring program; (i) contingency measures should the success criteria not be met; and (j) identification of the party responsible for meeting the success criteria and providing for long-term conservation of the mitigation site.

5. Take of species of plants or animals listed as endangered or threatened under CESA is unlawful unless authorized by the Department. However, a CESA 2081(b) Incidental Take Permit may authorize incidental take during Project construction or over the life of the Project. The DEIR must state whether the Project could result in any amount of incidental take[3] of any CESA-listed species. Early consultation for incidental take permitting is encouraged, as significant modification to the Project's description and/or mitigation measures may be required in order to obtain a CESA Permit.

The Department's issuance of a CESA Permit for a project that is subject to CEQA will require CEQA compliance actions by the Department as a Responsible Agency. The Department as a

[3] Even a single individual.

Responsible Agency under CEQA will consider the Lead Agency's Negative Declaration or Environmental Impact Report for the Project. The Department may require additional mitigation measures for the issuance of a CESA Permit unless the Project CEQA document addresses all Project impacts to listed species and specifies a mitigation monitoring and reporting program that will meet the requirements of a CESA Permit.

To expedite the CESA permitting process, the Department recommends that the DEIR addresses the following CESA Permit requirements:

a. The impacts of the authorized take are minimized and fully mitigated;
b. The measures required to minimize and fully mitigate the impacts of the authorized take and: (1) are roughly proportional in extent to the impact of the taking on the species; (2) maintain the applicant's objectives to the greatest extent possible, and (3) are capable of successful implementation;
c. Adequate funding[4] is provided to implement the required minimization and mitigation measures and to monitor compliance with and the effectiveness of the measures; and
d. Issuance of the permit will not jeopardize the continued existence of a State-listed species.

6. The Department has responsibility for wetland and riparian habitats. It is the policy of the Department to strongly discourage development in wetlands or conversion of wetlands to uplands. We oppose any development or conversion which would result in a reduction of wetland acreage or wetland habitat values, unless, at a minimum, Project mitigation assures there will be "no net loss" of either wetland habitat values or acreage. The DEIR should demonstrate that the Project will not result in a net loss of wetland habitat values or acreage.

a. If the Project site has the potential to support aquatic, riparian, or wetland habitat, a delineation of lakes, streams, and associated riparian habitats potentially affected by the Project should be provided for agency and public review. This report should include a preliminary jurisdictional delineation including wetlands identification pursuant to the U.S. Fish and Wildlife Service wetland definition[5] as adopted by the Department[6].

[4] A letter of credit or cash security is typically required.

[5] Cowardin, Lewis M., et al. 1979. Classification of Wetlands and Deepwater Habitats of the United States. U.S. Department of the Interior, Fish and Wildlife Service.

Please note that some wetland and riparian habitats subject to the Department's authority may extend beyond the jurisdictional limits of the U.S. Army Corps of Engineers. The jurisdictional delineation should also include mapping of ephemeral, intermittent, and perennial stream courses potentially impacted by the Project. In addition to "federally protected wetlands" (see CEQA Appendix G), the Department considers impacts to any wetlands (as defined by the Department) as potentially significant.

b. The Project may require a Lake or Streambed Alteration Agreement, pursuant to Section 1600 et seq. of the Fish and Game Code, with the applicant prior to the applicant's commencement of any activity that will substantially divert or obstruct the natural flow or substantially change the bed, channel, or bank (which may include associated riparian resources) of a river, stream or lake, or use material from a streambed. The Department's issuance of a Lake or Streambed Alteration Agreement for a project that is subject to CEQA will require CEQA compliance actions by the Department as a Responsible Agency. The Department as a Responsible Agency under CEQA may consider the local jurisdiction's (Lead Agency) Negative Declaration or Environmental Impact Report for the Project. To minimize additional requirements by the Department pursuant to Section 1600 et seq. and/or under CEQA, the document should fully identify the potential impacts to the lake, stream or riparian resources and provide adequate avoidance, mitigation, monitoring and reporting commitments for issuance of the agreement. The project as proposed requires notification to the Department pursuant to 1600 et seq. of the Fish and Game Code. A Streambed Alteration Agreement notification package may be obtained through the Department's website at http://www.dfg.ca.gov/habcon/1600/.

[6] California Fish and Game Commission Policies: Wetlands Resources Policy; Wetland Definition, Mitigation Strategies, and Habitat Value Assessment Strategy; Amended 1994

The Department appreciates the opportunity to comment on this Project. Questions regarding this letter and further coordination on this Project should be directed to Matt Myers, Senior Environmental Specialist, at (530) 225-3846 or by email Matt.Myers@wildlife.ca.gov.

Sincerely,

Curt Babcock
Habitat Conservation Program Manager

ec: State Clearinghouse,
Messrs. Neil Manji, Curt Babcock, Michael Harris, Matt Myers, and
Mss. Michelle Lobo, Donna Cobb and Amy Henderson
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amy.henderson@wildlife.ca.gov

Lobo, Michelle@Waterboards

From: Lobo, Michelle@Waterboards
Sent: Friday, March 27, 2015 2:47 PM
To: Lobo, Michelle@Waterboards
Subject: FW: LLHP 60KV Route

From: Tom Carrier [mailto:tomcarrier@yahoo.com]
Sent: Tuesday, February 10, 2015 9:34 AM
To: SMoore@co.tehama.ca.us; Barnes, Peter@Waterboards
Subject: LLHP 60KV Route

Mr Moore, Mr Barnes

Thank you for your informative support last night at the LLHP meeting at Manton Grange. I would like to question the proposed route of the 60kv transmission line. The proposed route shows line going west on Hazen Road, turning north on Manton School Road, then turning west, then turning north, then turning west going to South P.H. Road, crossing multiple properties.

I would like to recommend that the 60kv line route continue west all the way to South Power House Road where it could intersect PG&E existing 60kv line. This route would have several benefits over the proposed route.

#1 It is a shorter, straighter route which is less expensive

#2 Battle Creek Restoration Project, Tehama County, Cal-Fire, have supported the development of "Hazen Road Fire Break"

If the 60kv line continued down Hazen Road on the "South Side" the line clearing would support the fire break as some of the property owners have on the North side.

#3 Would impact fewer property owners

#4 Would have better access for maintenance when required, being it is adjacent to existing road all the way.

Thank you support

Thomas Carrier

Lassen Lodge
Hydroelectric Project
(FERC Number 12496)

APPENDIX

B

CALEEMOD MODELING

Lassen Lodge_Construction Equipment Details and Assumptions

Construction Equipment[1]	CalEEMod Input Construction Equipment	Quantity[1]	Number of Hours Per Day[1]	CalEEMod Input # of Hours Per Day[2]
Excavator (Volvo)	Excavator	1	1.5	2
Excavator (CASE 210)	Excavator	1	5.7	6
Excavator (CAT 345)	Excavator	1	4.3	5
Excavator (SK210)	Excavator	1	0.4	1
Water Truck	Off-Highway Truck	1	2.9	3
Haul Truck	Off-Highway Truck	1	0.9	1
Pad Foot Roller	Roller	1	3	3
Air Compressor	Air Compressor	1	3.1	3
Loader (CASE 570)	Rubber Tired Loader	1	0.4	1
Grader	Grader	1	0.7	1
Dozer (D8)	Crawler Tractor	1	1	1
Dozer (D6)	Crawler Tractor	1	6.5	7
Loader (Komatsu 320)	Rubber Tired Loader	1	0.7	1
Truck (Lube Truck)	Off-Highway Truck	1	1.8	2
Truck (Mechanics)	Off-Highway Truck	1	1.8	2
Forklift	Rough Terrain Forklift	1	2.3	3
Pickup	Included in Worker Vehicle Trips	2	5.5	
Skidder	Other Construction Equipment	1	0.7	1

[1] Source: Estimator, James Folsom, Hat Creek Construction & Materials, Inc.

[2] The number of hours per day were rounded up to whole numbers for input into CalEEMod.

Assumptions

Construction crew carpools of three to six crew members. Up to 30 crew members.

Assume 10 carpools (vehicles) from Redding as worst cast to multiple staging areas. Added two vehicles for a total of 12 carpool vehicles to account for the two pickup truck anticipated for daily use around the project site.

Assume 10 haul trips from Redding needed to bring materials to the site.

No import or export of soil or other materials needed.

Multipurpose areas 1, 2, and 3 are accessed via dirt roads. Multipurpose area #4 is adjacent to a paved road.

Vehicle Trip Distrance

From	To	Distance One Way (miles)	Unpaved Miles	Roundtrip Miles	Unpaved Miles Roundtrip
City of Redding	MP Area #1	55	0.75	110	1.5
City of Redding	MP Area #2	55	0.6	110	1.2
City of Redding	MP Area #3	56	2.3	112	4.6
City of Redding	MP Area #4	39	0	78	0
			Average	102.5	1.825

1.780487805

2%

Lassen Lodge Hydrolectric Project

Tehama County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Light Industry	0.00	1000sqft	250.00	0.00	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	3.1	**Precipitation Freq (Days)**	68
Climate Zone	3			**Operational Year**	2022
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Lassen Lodge Hydrolectric Project - Tehama County, Summer

Project Characteristics -

Land Use - The Project Area is 250 acres.

Construction Phase - Assumes project will occur over during one construction season.

Off-road Equipment - No arch coating phase.

Off-road Equipment - Equipment list based on Construction Equipment Assumptions table.

Trips and VMT - Assumes 30 crew would carpool in 10 vehicles from Redding to the four multipurpose areas plus two vehicles anticipated for daily use around the project site. The 10 haul trips is for bringing materials to the site.

On-road Fugitive Dust - Multipurpose areas 1, 2, and 3 are accessed via dirt roads. Multipurpose area #4 is adjacent to a paved road. An average of 2 miles of road traveled is dirt.

Grading - The project will disturb 250 acres.

Architectural Coating -

Vehicle Emission Factors -

Vehicle Emission Factors -

Vehicle Emission Factors -

Construction Off-road Equipment Mitigation - A water truck will apply water to unpaved roads at least 2x per day resulting in a 55% reduction in PM emissions.

Fleet Mix -

Lassen Lodge Hydrolectric Project - Tehama County, Summer

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadMoistureContent	0	0.5
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	40
tblConstructionPhase	NumDays	465.00	132.00
tblGrading	AcresOfGrading	74.25	250.00
tblLandUse	LotAcreage	0.00	250.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	UsageHours	8.00	6.00
tblOffRoadEquipment	UsageHours	8.00	2.00
tblOffRoadEquipment	UsageHours	8.00	5.00
tblOffRoadEquipment	UsageHours	8.00	1.00
tblOffRoadEquipment	UsageHours	8.00	1.00
tblOffRoadEquipment	UsageHours	8.00	1.00
tblOnRoadDust	HaulingPercentPave	100.00	98.00
tblOnRoadDust	WorkerPercentPave	100.00	98.00
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblTripsAndVMT	HaulingTripLength	20.00	103.00
tblTripsAndVMT	HaulingTripNumber	0.00	10.00
tblTripsAndVMT	WorkerTripLength	16.80	103.00
tblTripsAndVMT	WorkerTripNumber	43.00	12.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	2.3308	20.4596	18.9816	0.0463	39.5476	0.8413	40.3889	4.1169	0.7778	4.8946	0.0000	4,510.6845	4,510.6845	1.1433	0.0000	4,539.2673
Maximum	**2.3308**	**20.4596**	**18.9816**	**0.0463**	**39.5476**	**0.8413**	**40.3889**	**4.1169**	**0.7778**	**4.8946**	**0.0000**	**4,510.6845**	**4,510.6845**	**1.1433**	**0.0000**	**4,539.2673**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	2.3308	20.4596	18.9816	0.0463	18.3077	0.8413	19.1490	1.9883	0.7778	2.7661	0.0000	4,510.6845	4,510.6845	1.1433	0.0000	4,539.2673
Maximum	**2.3308**	**20.4596**	**18.9816**	**0.0463**	**18.3077**	**0.8413**	**19.1490**	**1.9883**	**0.7778**	**2.7661**	**0.0000**	**4,510.6845**	**4,510.6845**	**1.1433**	**0.0000**	**4,539.2673**

Lassen Lodge Hydrolectric Project - Tehama County, Summer

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**53.71**	**0.00**	**52.59**	**51.70**	**0.00**	**43.49**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Grading	Grading	4/15/2021	10/15/2021	5	132	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 250

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Grading	Air Compressors	1	3.00	78	0.48
Grading	Crawler Tractors	1	1.00	212	0.43
Grading	Crawler Tractors	1	7.00	212	0.43
Grading	Excavators	1	6.00	158	0.38
Grading	Excavators	1	2.00	158	0.38
Grading	Excavators	1	5.00	158	0.38
Grading	Excavators	1	1.00	158	0.38
Grading	Graders	1	1.00	187	0.41
Grading	Off-Highway Trucks	1	1.00	402	0.38
Grading	Off-Highway Trucks	1	3.00	402	0.38
Grading	Off-Highway Trucks	2	2.00	402	0.38
Grading	Other Construction Equipment	1	1.00	172	0.42
Grading	Rollers	1	3.00	80	0.38
Grading	Rough Terrain Forklifts	1	3.00	100	0.40
Grading	Rubber Tired Dozers	0	8.00	247	0.40
Grading	Rubber Tired Loaders	1	1.00	203	0.36
Grading	Scrapers	0	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	1	1.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Grading	17	12.00	0.00	10.00	103.00	6.60	103.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Soil Stabilizer

Water Exposed Area

3.2 Grading - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.0085	0.0000	2.0085	0.2169	0.0000	0.2169			0.0000			0.0000
Off-Road	1.9600	20.0976	15.4495	0.0366		0.8348	0.8348		0.7717	0.7717		3,543.6837	3,543.6837	1.1102		3,571.4398
Total	**1.9600**	**20.0976**	**15.4495**	**0.0366**	**2.0085**	**0.8348**	**2.8433**	**0.2169**	**0.7717**	**0.9886**		**3,543.6837**	**3,543.6837**	**1.1102**		**3,571.4398**

3.2 Grading - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	2.2400e-003	0.0637	0.0109	2.7000e-004	0.2364	3.3000e-004	0.2367	0.0248	3.2000e-004	0.0251		27.9498	27.9498	8.3000e-004		27.9704
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.3686	0.2983	3.5212	9.4300e-003	37.3027	6.2000e-003	37.3089	3.8752	5.7200e-003	3.8809		939.0510	939.0510	0.0322		939.8571
Total	**0.3708**	**0.3620**	**3.5321**	**9.7000e-003**	**37.5391**	**6.5300e-003**	**37.5456**	**3.9000**	**6.0400e-003**	**3.9060**		**967.0008**	**967.0008**	**0.0331**		**967.8275**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.9038	0.0000	0.9038	0.0976	0.0000	0.0976			0.0000			0.0000
Off-Road	1.9600	20.0976	15.4495	0.0366		0.8348	0.8348		0.7717	0.7717	0.0000	3,543.6837	3,543.6837	1.1102		3,571.4398
Total	**1.9600**	**20.0976**	**15.4495**	**0.0366**	**0.9038**	**0.8348**	**1.7386**	**0.0976**	**0.7717**	**0.8693**	**0.0000**	**3,543.6837**	**3,543.6837**	**1.1102**		**3,571.4398**

3.2 Grading - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	2.2400e-003	0.0637	0.0109	2.7000e-004	0.1101	3.3000e-004	0.1104	0.0122	3.2000e-004	0.0125		27.9498	27.9498	8.3000e-004		27.9704
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.3686	0.2983	3.5212	9.4300e-003	17.2937	6.2000e-003	17.2999	1.8786	5.7200e-003	1.8843		939.0510	939.0510	0.0322		939.8571
Total	**0.3708**	**0.3620**	**3.5321**	**9.7000e-003**	**17.4038**	**6.5300e-003**	**17.4104**	**1.8907**	**6.0400e-003**	**1.8968**		**967.0008**	**967.0008**	**0.0331**		**967.8275**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
General Light Industry	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
General Light Industry	14.70	6.60	6.60	59.00	28.00	13.00	92	5	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
General Light Industry	0.540336	0.029412	0.157066	0.102087	0.028425	0.006525	0.008874	0.118098	0.001183	0.001249	0.004818	0.000900	0.001027

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
General Light Industry	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
General Light Industry	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Lassen Lodge Hydrolectric Project

Tehama County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Light Industry	0.00	1000sqft	250.00	0.00	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	3.1	**Precipitation Freq (Days)**	68
Climate Zone	3			**Operational Year**	2022
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - The Project Area is 250 acres.

Construction Phase - Assumes project will occur over during one construction season.

Off-road Equipment - No arch coating phase.

Off-road Equipment - Equipment list based on Construction Equipment Assumptions table.

Trips and VMT - Assumes 30 crew would carpool in 10 vehicles from Redding to the four multipurpose areas plus two vehicles anticipated for daily use around the project site. The 10 haul trips is for bringing materials to the site.

On-road Fugitive Dust - Multipurpose areas 1, 2, and 3 are accessed via dirt roads. Multipurpose area #4 is adjacent to a paved road. An average of 2 miles of road traveled is dirt.

Grading - The project will disturb 250 acres.

Architectural Coating -

Vehicle Emission Factors -

Vehicle Emission Factors -

Vehicle Emission Factors -

Construction Off-road Equipment Mitigation - A water truck will apply water to unpaved roads at least 2x per day resulting in a 55% reduction in PM emissions.

Fleet Mix -

Lassen Lodge Hydrolectric Project - Tehama County, Annual

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadMoistureContent	0	0.5
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	40
tblConstructionPhase	NumDays	465.00	132.00
tblGrading	AcresOfGrading	74.25	250.00
tblLandUse	LotAcreage	0.00	250.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	UsageHours	8.00	6.00
tblOffRoadEquipment	UsageHours	8.00	2.00
tblOffRoadEquipment	UsageHours	8.00	5.00
tblOffRoadEquipment	UsageHours	8.00	1.00
tblOffRoadEquipment	UsageHours	8.00	1.00
tblOffRoadEquipment	UsageHours	8.00	1.00
tblOnRoadDust	HaulingPercentPave	100.00	98.00
tblOnRoadDust	WorkerPercentPave	100.00	98.00
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblTripsAndVMT	HaulingTripLength	20.00	103.00
tblTripsAndVMT	HaulingTripNumber	0.00	10.00
tblTripsAndVMT	WorkerTripLength	16.80	103.00
tblTripsAndVMT	WorkerTripNumber	43.00	12.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021	0.1534	1.3537	1.2131	3.0000e-003	2.1575	0.0555	2.2130	0.2262	0.0513	0.2775	0.0000	264.8410	264.8410	0.0682	0.0000	266.5464
Maximum	**0.1534**	**1.3537**	**1.2131**	**3.0000e-003**	**2.1575**	**0.0555**	**2.2130**	**0.2262**	**0.0513**	**0.2775**	**0.0000**	**264.8410**	**264.8410**	**0.0682**	**0.0000**	**266.5464**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021	0.1534	1.3537	1.2131	3.0000e-003	1.0033	0.0555	1.0588	0.1104	0.0513	0.1617	0.0000	264.8408	264.8408	0.0682	0.0000	266.5461
Maximum	**0.1534**	**1.3537**	**1.2131**	**3.0000e-003**	**1.0033**	**0.0555**	**1.0588**	**0.1104**	**0.0513**	**0.1617**	**0.0000**	**264.8408**	**264.8408**	**0.0682**	**0.0000**	**266.5461**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**53.50**	**0.00**	**52.16**	**51.19**	**0.00**	**41.72**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	**4-15-2021**	**7-14-2021**	0.7407	0.7407
2	**7-15-2021**	**9-30-2021**	0.6349	0.6349
		Highest	0.7407	0.7407

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Grading	Grading	4/15/2021	10/15/2021	5	132	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 250

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Grading	Air Compressors	1	3.00	78	0.48
Grading	Crawler Tractors	1	1.00	212	0.43
Grading	Crawler Tractors	1	7.00	212	0.43
Grading	Excavators	1	6.00	158	0.38
Grading	Excavators	1	2.00	158	0.38
Grading	Excavators	1	5.00	158	0.38
Grading	Excavators	1	1.00	158	0.38
Grading	Graders	1	1.00	187	0.41
Grading	Off-Highway Trucks	1	1.00	402	0.38
Grading	Off-Highway Trucks	1	3.00	402	0.38
Grading	Off-Highway Trucks	2	2.00	402	0.38
Grading	Other Construction Equipment	1	1.00	172	0.42
Grading	Rollers	1	3.00	80	0.38
Grading	Rough Terrain Forklifts	1	3.00	100	0.40
Grading	Rubber Tired Dozers	0	8.00	247	0.40
Grading	Rubber Tired Loaders	1	1.00	203	0.36
Grading	Scrapers	0	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	1	1.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Grading	17	12.00	0.00	10.00	103.00	6.60	103.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Soil Stabilizer

Water Exposed Area

3.2 Grading - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1326	0.0000	0.1326	0.0143	0.0000	0.0143	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1294	1.3264	1.0197	2.4200e-003		0.0551	0.0551		0.0509	0.0509	0.0000	212.1752	212.1752	0.0665	0.0000	213.8371
Total	**0.1294**	**1.3264**	**1.0197**	**2.4200e-003**	**0.1326**	**0.0551**	**0.1877**	**0.0143**	**0.0509**	**0.0652**	**0.0000**	**212.1752**	**212.1752**	**0.0665**	**0.0000**	**213.8371**

3.2 Grading - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.5000e-004	4.4000e-003	7.3000e-004	2.0000e-005	0.0128	2.0000e-005	0.0128	1.3500e-003	2.0000e-005	1.3700e-003	0.0000	1.6693	1.6693	5.0000e-005	0.0000	1.6706
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0238	0.0228	0.1927	5.6000e-004	2.0122	4.1000e-004	2.0126	0.2105	3.8000e-004	0.2109	0.0000	50.9965	50.9965	1.6900e-003	0.0000	51.0387
Total	**0.0240**	**0.0272**	**0.1934**	**5.8000e-004**	**2.0250**	**4.3000e-004**	**2.0254**	**0.2119**	**4.0000e-004**	**0.2123**	**0.0000**	**52.6658**	**52.6658**	**1.7400e-003**	**0.0000**	**52.7093**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0597	0.0000	0.0597	6.4400e-003	0.0000	6.4400e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1294	1.3264	1.0197	2.4200e-003		0.0551	0.0551		0.0509	0.0509	0.0000	212.1750	212.1750	0.0665	0.0000	213.8368
Total	**0.1294**	**1.3264**	**1.0197**	**2.4200e-003**	**0.0597**	**0.0551**	**0.1147**	**6.4400e-003**	**0.0509**	**0.0574**	**0.0000**	**212.1750**	**212.1750**	**0.0665**	**0.0000**	**213.8368**

3.2 Grading - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.5000e-004	4.4000e-003	7.3000e-004	2.0000e-005	5.9800e-003	2.0000e-005	6.0000e-003	6.7000e-004	2.0000e-005	6.9000e-004	0.0000	1.6693	1.6693	5.0000e-005	0.0000	1.6706
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0238	0.0228	0.1927	5.6000e-004	0.9376	4.1000e-004	0.9380	0.1033	3.8000e-004	0.1037	0.0000	50.9965	50.9965	1.6900e-003	0.0000	51.0387
Total	**0.0240**	**0.0272**	**0.1934**	**5.8000e-004**	**0.9436**	**4.3000e-004**	**0.9440**	**0.1040**	**4.0000e-004**	**0.1044**	**0.0000**	**52.6658**	**52.6658**	**1.7400e-003**	**0.0000**	**52.7093**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
General Light Industry	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
General Light Industry	14.70	6.60	6.60	59.00	28.00	13.00	92	5	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
General Light Industry	0.540336	0.029412	0.157066	0.102087	0.028425	0.006525	0.008874	0.118098	0.001183	0.001249	0.004818	0.000900	0.001027

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
General Light Industry	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
General Light Industry	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
General Light Industry	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.3 Energy by Land Use - Electricity

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
General Light Industry	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr											MT/yr				
Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
General Light Industry	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
General Light Industry	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
General Light Industry	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
General Light Industry	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Helicopter Emissions Calculations

A helicopter would be used to install electric transmission line poles at a minority of pole locations and install conductor on the transmission line.

Helicopter Model	Sikorsky H-60 Blackhawk
Engine Type	T700-GE-700
Jet Fuel Density	6.74 lbs/gallon
CO2 Emissions Factor	9.57 kg/gallon of fuel
CH4 Emissions Factor	0.00027 kg/gallon of fuel
N20 Emissions Factor	0.00031 kg/gallon of fuel
CH4 Global Warming Potential	25
N20 Global Warming Potential	298
1 pound = 0.00045359237 metric tons	
THC to VOC Conversion Factor	1.15

Landing and Take Off (LTO)

		lb/LTO								
Operation	**Fuel Used (Consumption)**	**CO**	**THC**	**NOx**	**PM**	**Fugitive PM10**	**Fugitive PM 2.5**	**CO2**	**N20**	**CH4**
One LTO	161	1.62	1.28	1.26	0.037	3.31	0.33	228.60	0.007405	0.00645
	23.88724036			**Fugitive PM Mitigation**		1.49	0.15			

Operations

		lb/Cruise Hr								
Operation	**Fuel Used (Consumption)**	**CO**	**THC**	**NOx**	**PM**	**Fugitive PM10**	**Fugitive PM 2.5**	**CO2**	**N2O**	**CH4**
One Hour of Operation	1,120	2.95	2.45	11.97	0.33	0	0	1,590.27	0.051513	0.044866
	166.1721068									

		Criteria Pollutant Emissions (lbs/day)					GHG Emissions (lbs/day)			
Helicopter Activity	**Quantity**	**CO**	**THC**	**NOx**	**PM2.5**	**PM10**	**CO2**	**N2O**	**CH4**	**CO2e**
LTOs	4	6.48	5.12	5.04	1.47	13.39	914.4036	0.02962	0.025798	923.8753
LTOs w/Mitigation	4				0.74	6.11				
Operation Time (hrs)	7	20.65	17.15	83.79	2.31	2.31	11131.87	0.360593	0.314065	11247.18
	Total Per Day	27.13	22.27	88.83	3.78	15.70	12046.27	0.390214	0.339864	12171.05
	Total Per Day w/Mitigation				3.05	8.42				
		25.6105 = VOCs/ROGs								

GHG Emissions (Metric Tons Per Year)			
CO2	**N2O**	**CH4**	**CO2e**
721.2609	0.023364	0.020349	728.732

Notes:

Daily helicopter operations was assumed to have 4 LTOs with 7 hours of operation time.

One helicopter would be used for 132 work days from 4/15-10/15.

Criteria pollutant emissions factors and fuel burn rates taken from the Federal Office of Civil Aviation, Helicopter Emissions Table, July 2017

Greenhouse gas emission factors obtained from California Climate Action Registry General Reporting Protocol, Version 3.1, January 2009.

Global Warming Potential taken from the California Air Resources Board, GHG Global Warming Potentials. Found at: https://ww2.arb.ca.gov/ghg-gwps

THC Conversion Factor obtained from the U.S. Environmental Protection Agency, Recommended Best Practice for Quantifying Speciated Organic Gas Emissions from Aircraft Equipped with Turbofan, Turbojet, and Turboprop, Version 1.0, May 2009

Mitigation: The multipurpose staging area (e.g. landing and take off area) is assumed to be watered, reducing fugitive dust emissions by 55%.